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BULLETIN JAN 2021

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Mike Montemarano

PROTEIN FOODS AND NUTRITION DEVELOPMENT ASSOCIATION OF INDIA

2nd Floor, Mahalaxmi Chambers, 22 Bhulabhai Desai Rd., Mumbai - 26 (India)
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EDITORIAL

Traditionally, our diets used to be very balanced and conducive for health. We used to have adequate amounts of vegetables and fruits, whole grains and pulses, dairy products all providing proteins, dietary fibre and most vitamins and minerals and other healthy ingredients.

Slowly as we became more urbanised, our lifestyles changed and our diets became poorer with very few items that would adequately satisfy hunger but not provide desired nutrition and health outcomes due to too much of carbs with higher GI, too much fat with probably trans fatty acids and more salt. This is causing a lot of health problems with all kinds of lifestyle diseases. Certainly the lack of physical activity does not help at all.

It is very difficult to go back to traditional diets due to many reasons. This problem was seen as opportunity by many food manufacturers which gave rise to nutritious & healthy versions of the traditional diets with some modern twist.

As people had deficiency of protein, many foods were developed that had more proteins. Moreover, for vegetarians there is need & scope for improving the protein quality. This could be done by adding proteins of higher PDCAAS value such as milk or whey proteins, soya proteins etc. The increase in protein content in many cereal products like atta for roti or chapatti and biscuits, could be improved by adding pulse proteins which are less expensive.

Many of the products started reformulating using lesser sugar, fat especially trans fat, and salt so part of the problem of cardiovascular diseases and diabetes could be tackled. Dietary fibre also helps along with omega 3 fatty acids.

We are seeing a lot of these products in the market and they not only can improve the health of individuals but also does a valuable function of “creating awareness” about healthy foods among the consumers. Thus industry has been interacting more in this manner telling consumers about the health these foods could provide through advertisements and claims.

There are also misleading claims and those making them should be held responsible but advertisement and claims should be encouraged as they serve a valuable purpose of creating awareness. The organisations like ASCI and other food companies should be alert about dirty tricks played by some companies trying to mislead the consumers. They should be held accountable and prosecuted. Entire food industry must be aware of such activities which should be watching for such activities which not only gives bad name, but spreads misinformation.

PFNDAI has organised a series of online webinars to discuss various aspects of regulations involving Advertising & Claims, Labelling & Display and other consumer communication related ones. Hopefully there is a better understanding of all the regulations with proper and responsible communication which will facilitate awareness about foods having different nutrients and health benefits promoting health. Hope this spreads good awareness around.

Prof Jagadish Pai,
Executive Director,
PFNDAI

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LABELLING OF PRE-PACKAGED FOODS: A CRITIQUE

AUTHOR
Dr J I Lewis,
Chairman, Regulatory Affairs Committee: PFNDAI

A gazette notification Food Safety and Standards (Labelling and Display) Regulations 2020 was issued on 17th December 2020.

The original Packaging and Labelling, 2011 regulation is finally unpacked and notified separately:

- FSS (Packaging) Regulations 2018
- FSS (Advertisement and Claims) Regulations 2018
- FSS (Labelling and Display) Regulations 2020

When regulations are topically distinguished from each other with proper cross referencing a complete appreciation of its scope and compliance becomes evident and clear. Secondly allotting separate chapters within a regulation, as in this regulation, brings in ease of compliance. The following chapters have been set out.

- Chapter 1: General
- Chapter 2: Labelling of Pre-packaged foods.
- Chapter 3: Display of Information Food Service Establishments.
- Chapter 4: Labelling requirements of non-retail container
- Chapter 5: Labelling of food additives when sold as such
- Schedule I: Logo for fortified food and organic food
- Schedule II: Mandatory declarations (for approx. 38 ingredients or additives or articles of food)

While the regulation has some welcome changes, certain inconsistencies yet remain and getting worse e.g., providing "the information under the regulations" on the Principal Display Panel, and the needless ambiguity by introducing a duplicitous term "front on pack".

This critique is not intended to be an interpretation of the regulation and the reader may want to explore other texts on the matter.

Chapter 1: General

1. Short Title and Commencement

- FBO's are required to comply with all the provisions after one year form the date of publication in the Official Gazette (17th November 2020), except.
- FBO's in food service establishments, compliance with display of information required under Chapter 3, shall be 1st January 2022.

2. Definitions: are important provisions in law, as they give substance to meaning of terms used throughout the regulatory text, the absence of which, leads to misinterpretation, and impossible compliances.

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• "Best before date" [2(1)©] with its established meaning since 2000, is now with attached words" however the product shall not be sold if any stage the product becomes unsafe". When the original definition includes requirements that "the product shall remain fully marketable "and the "food may still be perfectly safe to consume, though the quality may have diminished", the attached words are extraneous. Shelf life determinations are based on quality, safety and assurance that claimed benefits are commensurate with definitions of best before and use by dates. Secondly under Sec.26 the responsibilities of FBO's regarding food safety is addressed for the manufacture, sale and distribution of any article of food.
• A new definition of Front of Pack [2(1)(i)]"means part of the package that faces forward (in the principal field of vision) and is typically the first thing a consumer will see when they look at the product". Isn't this similar to the more universally and better drafted expression of the Principal Display Panel (PDP). Consumers are attracted to the PDP because "that part of the container is intended" – by design through branding, graphics, pictures – and is therefore "likely to be displayed or presented or shown" by the shop attendant and therefore "examined by the customer under normal and customary conditions of display, sale or purchase" (Fig.1).

• If at all a food package panel becomes 'front of pack", it is from the definition of PDP, a term in use for over 30 years when the term FOP did not exist. So why now? What is the evidence or reason for this change?

• The definition of non-vegetarian food [2(1)(o)] is amended to specifically exclude bees wax, carnauba and shellac; carnauba is obtained from the palm tree Copernicia cerifera (JECFA monograph). The Authority should seriously have also considered inclusion of Vitamin D3 (cholecalciferol), a more efficacious form of Vitamin D than Vitamin D2 (ergocalciferol).

3. FSSAI may establish an internal mechanism to address issues arising out of implementation/ interpretation of the regulation. This regulation provides a method for correction and improvement and is a welcome insertion.

Chapter 2: Labelling of prepackaged foods

4. General requirements

• Regulation [4(2)], introduced specially for products sold through e- commerce or any other direct selling means, the mandatory requirements as given in these regulations shall be provided to the consumer through appropriate means before sale except "batch number/lot number, best before date, expiry date and date of manufacture/packing". A plain reading gives the impression that an exemption is implied, which is not the case. Product labels displayed on e-platforms are generally static and cannot reflect production updates. An explanation is required to avoid misinterpretation.
• Although explicitly stated in the Act, repetition [4(6)] of "label on pre-packaged foods shall be applied in such a manner that it will not become separated from the container", appropriately reinforces compliance understanding.
• Labelling declarations on food packages with an outer transparent wrapper [4(8)], should be easily readable and where the package contains multiple units, at least one such unit should be readable.

Fig. 1 That part of the container intended and likely to be displayed, presented, shown or examined by the customer

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5. Labelling requirements:

• Even though not explicitly stated in regulations, the name of food is always declared on the PDP. Declaring the name of the food and net weight on the PDP is global practice. The new term front of pack [5(1)], is being force fitted and is going to have a viral effect of replacing the term PDP.
• Food additives carried over in an amount sufficient to perform its technological functions are to be declared [5(2)(c)].The regulation should have also clarified that a declaration is not required for processing aids and food additives where the amount is less than that required to achieve a technological function.
• The specific name of the ingredient is always to be declared [5(2)(d)] except for ingredients for which a class title is given under a 'proviso'. Yet the first three ingredients in the "class table" are to be declared by their specific names and not their class titles, contradicting the purpose of the proviso.
• The addition made to regulation [5(2)(g)], where an ingredient or category of ingredients emphasized through words, pictures or graphics are to be declared by their ingoing percentage, will have a significant impact on product value. Products where water is lost during processing, the percentage of the emphasized ingredient ought to be on the final product obtained. Consumers are interested in the quantity of the emphasized ingredient in the product as consumed not in its manufacturing complexities. This needs revision.
• Sub-regulation 5(2)(g)(ii) regarding "when the ingredient is not within the name of the food but is essential to characterize the food" inserted more than 20years back yet evades an example in an Indian context. Based on the past evidence or experience the sub-regulation should be examined for continuance or removal.
• Six provisos follow sub-regulation [5(2)(g)] providing conditions of exemptions from percentage declarations. A new proviso (vi) excludes "added micronutrients and their preparations like vitamins, minerals, amino acids that are the subject to a nutrition declaration as per requirements specified in regulation 5(3) from the percent declaration. The proviso should have actually stated that "any ingredient(s) that is subject to nutrition labelling, specified under 5(3) or a claim made under FSS (AC) 2018 of these regulations" are not considered to be emphasized ingredients or nutrients. The principle here is to avoid duplicitous labelling declarations.

Table 1: Consumer information as a percent daily energy.

Nutrient	% Energy	FSS (LD) 2020	Ref. Intake (EU)	% DV (US)
Energy (Kcal)	-	2000	2000	2000
Total Fat (g)	30	67	70	65
Saturated Fat (g)	10	22	20	20
Trans Fat (g)	1	2	-	-
Sugar (g)	10	50	90	-
Sodium (mg) or Salt (g)	-	2000 (5g)	6g	2400

Nutrition Information 5(3)

• Sub- regulation (b) (i, ii & iv)) requires nutritional information on nutrients (both macro and micro) to be given:
o per 100g or 100ml or single consumption pack; and
o per serve percentage (%) contribution to RDA calculated on the basis of 2000 kcal energy.
o The amount of food in gram (g) or milliliter (ml) for reference beside the serving measure and the number of servings in the package.
• Contributions by macro nutrients are expressed as a percent of energy (Table 1), not RDA. These inclusions are directionally important information to consumers for monitoring their daily intake for a healthy diet.

• The models of providing nutrition information followed universally are:
o Per 100g/100ml or
o Per serve or portion size
o FSS (PL) 2011 provided both options of 100g or 100ml or per serve.
• The requirement under the new regulation (Fig 2) will be baffling to consumers. From the illustrated product (not a single serve pack), the consumer gets nutrition information on 100g and the accompanying column on" per serve %"relates to a serve (18g). The misinformation likely to register and prevail is that 100g of biscuits will provide just 4% of daily energy or calories and 6% total fat.

• We should adopt what is simple for the Indian consumer understanding and avoid adopting everything available elsewhere. Consider seriously that household measures (bowl, tablespoon, teaspoon or number of units) evoke clear imagery of quantity consumed and registers more firmly than 100g or 100ml.

Fig. 2: Nutrition Information

Serve size: 2 biscuits (18g)
No of serves per pack 20

	100g	per serve %
Energy, kcal	490	4
Protein	7	
Total fat, g	21	6
Saturated fat	11	9
Trans fat	0	
Carbohydrate, g	67	
Sugar, g	16	6

Illustration only

Reference daily value [FSS(LD) 2020]

Energy, kcal	2000	Trans fat, g	2.2
Total fat, g	67	Sugar, g	50
Staturated fat,g	22	Sodium*, mg	2000

* corresponds to 5g salt

Fig. 3: WHO recommendation on trans fat

Colloquially, we refer to a cup of coffee, a bowl of cornflakes, a teaspoon of sugar, a tablespoon of oil or a glass of milk. To overcome the lack of standardized measures, FSS (PL) 2011 very correctly required the weight or volume to accompany the household measure in (g) or (ml). There is no plausible explanation or reason for the change which has served us well since 2005.

• Several countries including India's "Eat Right India" by FSSAI, have encouraged reduction of trans fats in the daily diet. The nutritional information of "not more than 2g" is in line with WHO recommendation (Fig 3).
• Eight food allergens [5(14)] are to be declared as "contains … (name of allergen) and where products are susceptible to cross contamination should declare "may contain … (name of allergen).
• Regulation (5(15)] regarding foods not meant for human consumption, which is outside the writ of the Food Authority, requires a logo.'

6. Principal Display Panel

• Regulation [6(1)]states "the information required under these regulations shall be given on the principal display panel of the package or container ....". However, when the PDP is defined as "that part of the package", accommodating approximately 12 -14 declarations on the PDP is an impossible compliance expectation.
• In regulation [6(3)], the height of any numeral and letter under these regulations, on the PDP shall be as given in Table I. Since 1998 under PFA and subsequently under FSS(PL) 2011, the height of the numeral was provided under its Table I for declaring the "Net quantity weight/volume" on the PDP. Over time a perfectly clear regulation has suffered immense distortion through its many revisions. A clear and perfect understanding of its meaning, and declarations between the Food Authority and Industry is overdue. It is quite clear that neither the Food Authority nor Legal Metrology have studied their original definitions of the same term PDP.
• FOP is now either replacing or duplicating PDP, in locations where the latter appears

Veg- Nonveg logo

FSS (PL) 2011: 2.2.2.(4)	Draft FSS(LD) 2019: 4.2(4)	FSS (LD) 2020: 5(4)
The symbol shall be prominently displayed on the package having contrast background on the principal display panel … just close in proximity to the name or brand name of the product	The symbol shall be prominently displayed on the package having contrast background on principal display panel, just close in proximity to the name or brand name of the product.	The symbol shall be prominently displayed on the package having contrast background on principal display panel, just close in proximity to the name or brand name of the product on front of pack.

FSS (PL) 2011*: 2.4.2.11	Draft FSS(LD) 2019: 4.2(4)	FSS(LD) 2020: Sch. II 2.1 (4)
Every package containing an admixture of edible oils shall carry the following label declaration immediately below its brand name/trade name on front of pack, namely:-	Every package containing an admixture of edible oils shall carry the following label declaration immediately below its brand name/trade name on front of pack, namely:	Every package containing an admixture of edible oils shall carry the following label declaration immediately below its brand name/trade name on front of pack, namely:

• Front of pack was introduced 24.12.2018

• Blended edible oils ▲

7. Mandatory declarations (Schedule II)

• Approximately 38 ingredients/additives are required to be prominently declared in letter and numeral of not less than 3mm enclosed in a rectangular box [7(1)].Unlike, the intent of regulation [5(2)9g)], where ingredients emphasized on the label – through words, graphics or pictures - are those appreciated or considered favourably by consumers, the prominence or emphasis through size and enclosure is to draw consumer attention, apparently, on the adverse presence of these ingredient/additives.

• Under [3(1)] a package of Pan Masala, should declare within a rectangular box "CHEWING OF PAN MASALA IS INJURIOUS TO HEALTH", with the same prominence applicable to declaring "MADE WITH EDIBLE VEGETABLE OIL" on frozen confections/dessert packs. So, what is the principle used here to discriminate these ingredients/additives from each other. Is there a criteria based on risk management, otherwise a good and safe product permitted by law containing these ingredients and/or substances is exposed to being viewed disparagingly by consumers.

• Every container of refined vegetable oil shall bear the following label:

Refined (name of oil) Oil

This requirement is covered under" name of food" in regulation [5(1)], the reason for a separate sub-regulation is unknown.

• Isomaltulose (INS 953),is required to prominently display [1(1)(3]in a rectangular box "Contains Isomaltulose …. (kcal) per 100g or 100ml. The purpose of such a declaration is unknown.

8. Exemptions from certain labelling requirements:

• Regulation 8(2) "In case of food with shelf-life of not more than seven days, the 'date of manufacture' may not be required to be mentioned on the label of packaged food articles, but the 'Expiry/use by' shall be mentioned on the label by the manufacturer or packer.

• Regulation [8(2) is not an exemption, but the manner of declaring shelf life on food packages of less than seven days shelf life. Logically it should have been lodged under Date marking [5(10)] which addresses all requirements regarding "best before date", "expiry date" and "manufacturing date". Regulations dealing with a specific labelling condition should be located and addressed comprehensive ly.

• Regulation 8(4) deals with food prepared and served for immediate consumption such as hotels, hospitals, etc. where information accompanies or is displayed at the point of sale or service of the food; this sub-regulation is misplaced under Chapter 2 "Labelling of Pre-packaged Foods", and should be moved to following Chapter 3 "Display of information in food service establishments"

Public comments and feedback to the Regulator are the essence of the public's ability to participate in the rulemaking process, mandated under Sec. 18(2)(d). A formal record of the facts and analysis presented during these deliberations, should be examined carefully before a regulatory measure is notified. This critique is to stimulate discussion on whether the Authority is receiving good quality inputs, whether drafting should be improved and above all an understanding of its impact.

Under regulation 3, FSSAI has introduced an "internal mechanism to address problems arising out of the implementation and interpretation of the regulation". This provides an opportunity for a review of the critical issues.

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CORIANDER: BEYOND GARNISHING

AUTHOR
Ms. Girija Damle,
Dietitian, PFNDAI

From the regular Dal to Shahi Paneer and from Mexican rice to Ramen noodles, all are incomplete without a garnish of fresh green coriander. The coriander leaves are called cilantro in many western countries, while the dry seed that is used as a spice is referred to as coriander. Cilantro leaves taste somewhat tart and lemony, while coriander seeds have a sweet, pungent taste. Other names for cilantro, are Chinese parsley, Dhania, Kothimbir, and Coriandrum sativum as its botanical name.

Coriander leaves are one of the 5 essential fresh masalas or condiments (green chilli, ginger, garlic, curry leaves, and coriander) used in Indian cooking, and always a free goodie rightfully received from the 'bhajiwala' (vegetable vendor) along with other vegetables. It is one of the easiest herbs to grow in your kitchen garden and a favourite among new gardening enthusiasts. To grow your own cilantro:

- Lightly crush the coriander seeds to open the pods, sprinkle them on some soil, and cover with a thin layer of soil and water generously.
- Keep the pot in dark till you see some sprouts.
- Once you see that all seeds have sprouted, shift the pot to your window sill or outdoors and let the sunlight do its magic.
- Water regularly and you will have your home-grown, fresh herb ready to use in about a month!

How to use fresh coriander leaves:

Coriander is an annual herb and is commonly grown in vegetable farms and kitchen gardens alike. All parts of the plant are edible, but the leaves and dried seeds are most commonly used. The tender stems and roots find use in East Asian cooking, especially Thai food.

Coriander roots (source: Wikipedia)

These fresh aromatic leaves need to be washed and cleaned thoroughly to get rid of soil and dirt stuck between roots and leaves before using. Once clean, they should be air-dried or pat dry thoroughly with a clean cloth before refrigerating them in an airtight container lined with a paper napkin.

Source: Wikipedia

Cilantro can be finely chopped to add to paratha dough, salads, garnishes, etc, or can be ground along with other spices and condiments to make chutneys, soups, gravy base, etc. A cute sprig of coriander can make a simple dish attractive and photogenic.
This humble herb is a favourite among Indians for its colour, flavour, ease of use, and cost-effectiveness. The Maharashtrian cuisine has a snack dedicated to cilantro called Kothimbir Wadi. It is a crispy, savoury, steamed and deep-fried finger food made with chickpea flour and coriander leaves, served with a mint and coriander chutney and a steaming cup of tea.

Health benefits of coriander leaves:

Apart from its use in cooking, coriander leaves or cilantro has many health benefits and therapeutic uses. Rich in vital micronutrients like vitamin C, iron, magnesium, vitamin K, calcium, thiamine, etc, coriander has beneficial effects on the skin, hair, eyes, bones, and immunity.

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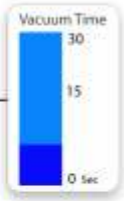

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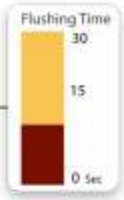

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Regular consumption of fresh coriander may prevent iron deficiency anemia. Its cell-protecting effects may reduce skin aging as well as protect from skin damage due to ultra-violet B radiation.

According to Ayurved, coriander leaves are easy to digest, prevent flatulence, control spasmodic pain, and are known to balance all three doshas - vata, kapha and pitta. This would explain why a sattvic ayurvedic meal is concluded with a serving of buttermilk with coriander, and cumin. Coriander seeds are used in ayurvedic medicine for the management of diarrhea, gout, burning eyes, fever, asthma, etc.

Quercetin, a flavonoid present in coriander leaves is a potent antioxidant and is known to reduce inflammation, promote heart health, relieve pain, improve liver function, protect against neurodegenerative disorders, prevent cancer, etc.

Coriander leaves may also facilitate the elimination of toxic metals from the body by binding them together. This mechanism may prevent heart disease, hormonal imbalances, neurological conditions, infertility, liver disorders, etc. A study in mice showed that regular cilantro consumption significantly reduced lead-induced oxidative stress and thus improved liver function.

How to use coriander seeds:

Coriander seeds are available in the dried form as whole seeds or as a powder. These can be used as-it-is to add flavour to your chutney, bhajiya, curries, etc, or can be used to make a variety of spice mixes ranging from garam masala to chaat masala and from sambar masala to chhole masala.

Coriander seeds can be stored for months, provided they are kept in airtight containers in a cool and dry place.

Health benefits of coriander seeds:

As mentioned earlier, coriander seeds are traditionally used in India and other countries for alleviating urinary tract infection, as a decoction in water. Rath et al studied and confirmed the antibacterial efficacy of 26 Indian spices against multidrug-resistant urinary tract infecting bacteria in an in vitro study.

Manville et al found that coriander activated neuronal voltage-gated potassium channel subfamily Q (KCNQ), the dysfunction of which causes severe epileptic encephalopathies that are resistant to modern anticonvulsants. This indicates the surprising benefits of coriander as an anticonvulsant. A similar mechanism also establishes the efficacy of coriander in the management of hypertension.

Coriander maintains brain health by reducing the risk of developing Alzheimer's disease, Parkinson's disease, and multiple sclerosis, by reducing inflammation and nerve cell damage which are potent causative factors. Coriander's memory-improving effect, suggests its application in Alzheimer's management. Animal studies also demonstrate that it is as effective as Diazepam for the management of common anxiety.

The spice also shows blood glucose-lowering effects. Soaking coriander seeds in water overnight and consuming the water in the morning can add to the benefits of a healthy diet and regular exercise for individuals living with diabetes. A study in rats found that a single dose of coriander seed extract suppressed hyper-glycemia and helped to achieve normoglycemia while also reducing insulin resistance, atherosclerotic indices, and showing cardioprotective effects. (2)

Nutritional value per 100 g (3.5 oz) of Coriander leaves

Energy	95 kJ (23 kcal)	Folate (B9)	51.01 µg (20.4%)
Carbohydrates	3.67 g	Vitamin C	23.87 mg (36.8%)
Sugars	0.87	Vitamin E	0.46 mg (0.8%)
Dietary fiber	2.8 g	Vitamin K	274 µg (6.7%)
Fat	0.52 g	Calcium	146 mg (18.3%)
Protein	2.13 g	Iron	5.3 mg (48.2%)
Vitamins	**Quantity (%RDA)†**	Magnesium	72.68 mg (19.6%)
Vitamin A equiv.	337 µg (73%)	Manganese	0.96 mg (24%)
Beta-Carotene	3808 µg	Phosphorus	64.69 mg (6.5%)
Lutein	6351 µg	Potassium	546 mg (15.6%)
Zeaxanthin	28.3	Sodium	37.00 mg (1.9%)
Thiamine (B1)	0.09 mg (7.5%)	Zinc	0.68 mg (4.8%)
Riboflavin (B2)	0.05 mg (3.1%)	Water	86.99 g
Niacin (B3)	0.73 mg (6.1%)		
Pantothenic acid (B5)	0.63 mg (12.6%)		
Vitamin B6	0.19 mg (12.5%)		

Source:RDA for Indians 2020, IFCT- 2017 (+RDA for Indian sedentary healthy adult man)

Along with cilantro, coriander seeds show cardioprotective effects by lowering LDL cholesterol, increasing HDL cholesterol, acting as a diuretic, and reducing salt intake because of its strong flavour (reducing the amount of salt required to flavour food).
We can thus say, that this small fresh green herb and its seeds not only make food Instagram worthy but also add to one's health by providing so many nutrients and positively affecting the health of various organ systems. It is rightfully an essential ingredient in most kitchens and should continue to be so.

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WONDERS OF OMEGA-3 FATTY ACIDS

AUTHOR

Ms. Swechha Soni,
Manager- Food & Nutrition,
PFNDAI

Do you ever come across people/ articles / diets that tell you to lower your fat intake for a healthy body, totally giving the "bad" title to it; and are you the one who believes this blindly?

If yes, you have definitely not explored much about the gem- the poly unsaturated fatty acids (PUFAs). Fats and oils are composed of triglycerides of fatty acids. These fatty acids with 2 or more cis double bonds that are separated from each other by methylene group are called polyunsaturated fatty acids (PUFA). Commonly there are two types of PUFA, omega-3 and omega-6 fatty acids. When it comes to fat, there's one type you shouldn't cut back on and that is omega-3 fatty acids. Omega-3 fatty acids also termed as (ω-3) are essential fats - the body can't synthesize and one needs to get them from food. They are widely distributed in nature and play an important role in the human diet and in human physiology.

There are three main omega-3s- alpha-linolenic acid (ALA), eicosapentaenoic acid (EPA), and docosahexaenoic acid (DHA). EPA and DHA come mainly from fish, so they are sometimes called marine omega-3s. ALA, the most common omega-3 fatty acid found in vegetable oils and nuts (especially walnuts), flax seeds and flaxseed oil, leafy vegetables, and some animal fat, especially in grass-fed animals. The human body generally uses ALA for energy, and also for conversion into EPA and DHA, by creating additional double bonds along its carbon chain and extending it but only in very small amounts. Therefore, getting EPA and DHA from foods (and dietary supplements if you take them) is the only practical way to increase levels of these omega-3 fatty acids in your body.

Why are omega-3 fats important?

Omega-3s are important components of the cell membranes. DHA levels are especially high in retina (eye), brain, and sperm cells. Omega-3s also provide calories to give your body energy and have many functions in your heart, blood vessels, lungs, immune system, and endocrine system (the network of hormone-producing glands).

Dietary Sources of omega-3 fatty acids

Omega-3 fatty acids are exclusively found in aquatic organisms and mainly originate in the liver of lean white fish such as cod and halibut, the body of oily fish such as mackerel, menhaden, and salmon, and the blubber of marine mammals such as seals and whales. The major ω-3 fatty acids from marine sources are EPA and DHA.

Among all fish oils, cod flesh, halibut, and skipjack tuna have been shown to contain the highest amounts of DHA (30% of total FAs), whereas cod flesh, flounder species, and haddock contain the highest amounts of EPA (15–19% of total FAs). In addition to fish and marine mammals, crustaceans, bivalves, and cephalopods also contain ω-3 PUFA. Among some tested seafood in a study, salted mackerel contained a high amount of EPA and DHA (4.57 g/100 g of cooked sample) compared with other cooked fish. The primary source of ALA is plants. Flaxseed, chia seeds, and walnut are known to be good sources of ALA. Flaxseed oil contains 49.2 g/100 g.Other sources of ALA are walnut, canola, and soybean oils. EPA and DHA can be synthesized in the body using ALA as a precursor.

Market Trends & Insights

In the past few years, omega 3 fatty acids have gained remarkable popularity due to its effectiveness in the treatment of a variety of health conditions including depression, bone loss, menstrual health, and mental health. The most significant source of omega-3 is fish oil.

The recent evolution in market trends such as the rising popularity of plant based foods, clean labelled ingredients has contributed to the exploration of novel sources to extract PUFA. Another major factor is that as over the years the demand for direct consumption of fish has been increasing leading to its low population, the scope for natural & suitable alternatives has become huge.

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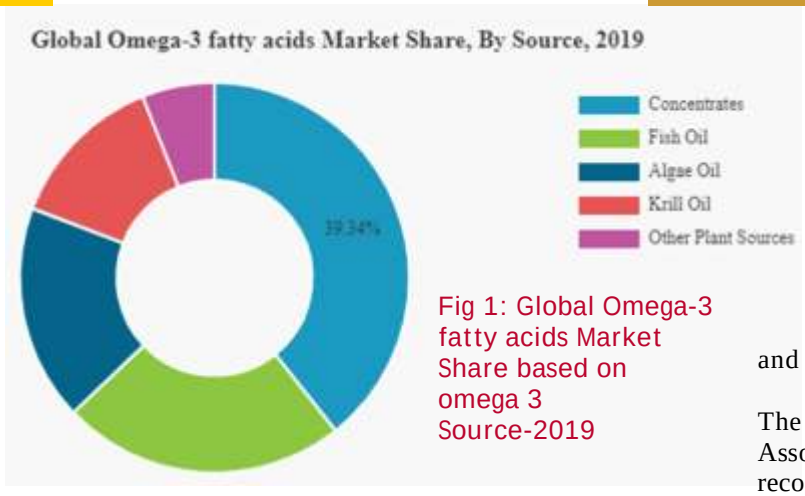

Fig 1: Global Omega-3 fatty acids Market Share based on omega 3 Source-2019

Algae oil & flax seeds are the noteworthy alternative sources of omega-3 and perfect for the consumers following vegetarian diets. One challenge being faced by plant sourced omega 3 ingredient manufacturers is competitive price range. These algae oils companies are facing challenges to sell products at competitive prices relative to fish oil sourced natural DHA and EPA. The global omega 3 market size was valued at USD 2.49 billion in 2019 and is expected to expand at a CAGR of 7.7% by 2027.
The concentrates segment is expected to hold largest market share, attributable to the high percentage of EPA & DHA present in them. They contain more than 80% EPA & DHA combined.

Health Effects of Omega 3 Fatty Acids

Cardiovascular Diseases (CVD)

CVD is one of the major causes of increased mortality rate worldwide. Numerous studies have been conducted on the effects of ω-3 PUFAs on major cardiovascular conditions, such as myocardial infarction, atherosclerosis, coronary heart disease, heart failure, sudden cardiac death, etc showing low risk of death due to these conditions on regular consumption of fish. The omega-3 fatty acids docosahexaenoic acid (DHA) and eicosapentaenoic acid (EPA), have emerged as possible protective factors associated with a decreased cardiovascular risk in populations with a high marine food intake. The potential protection offered by these omega-3 fatty acids in cardiovascular disease (CVD) may relate to their effects on lipid metabolism, thrombosis and inflammation.

The American Heart Association (AHA) recommends eating one to two servings of seafood per week to reduce your risk of some heart problems, especially if you consume the seafood in place of less healthy foods. For people with heart disease, the AHA recommends consuming about 1 g per day EPA plus DHA, preferably from oily fish, but supplements are an option under the guidance of a healthcare provider. The AHA does not recommend omega-3 supplements for people who do not have a high risk of cardiovascular disease.

Diabetes

ω-3 PUFAs or fish oil supplementation have shown to exert beneficial effects against Type 2 diabetes. Whether omega-3 has any effect on diabetes is still debated. While some have shown that it increased insulin sensitivity and reduced serum C reactive protein; others have shown no effect. Some studies have shown evidence of omega 3 on type 2 diabetes. This shows that controversies still exist with respect to the effect of ω-3 PUFAs in diabetes and insulin resistance & hence more clinical studies are required.

Cancer

Over the past decade, experimental and epidemiological studies have shown that the ω-3 PUFAs reduce the risk of cancer. Based on cross-cultural studies among people from Canada, Alaska, and Greenland, it was reported that the incidence rate of prostate cancer among the Inuit population was 70–80% less than that of non-Inuit population and attributed this to the traditional seafood diet, which is rich in ω-3 PUFAs, of the Inuit population.

ω-3 PUFAs affect various types of cancer, including prostate, colon, breast, lung, colorectal, ovarian, pancreatic, skin, and stomach. In addition, ω-3 PUFAs have been shown to improve the efficacy and tolerability of chemotherapy. Combining ω-3 with 1α,25-dihydroxy-vitamin D3 has been found to increase cell apoptosis (programmed cell death) in breast cancer cell lines. Dietary supplementation with ω-3s, α-tocopherol, linolenic acid, fibre, and phytoestrogen exerts a positive effect in breast cancer patients.

Alzheimer's disease and Dementia

Lower intakes of ω-3 PUFAs are associated with an increased risk of cognitive decline or dementia, especially for Alzheimer's disease. Clinical evidence exists for ω-3s and prevention of Alzheimer's disease. DHA is the primary component of membrane phospholipids in the brain.

The intake of fish and ω-3 PUFAs exerts a positive cognitive health effect in older healthy adults. ω-3 supplementation could also benefit older adults with memory complaints/mild cognitive impairment and Alzheimer's disease, based on various studies published during 2015–2016.

Depression

World Health Organization (WHO) had stated that depression will be the second leading disability worldwide by 2020. Consumption of fish is associated with lower risk of depression. Supplementation with ω-3 PUFAs exerts a positive effect in pregnant schizophrenic women. EPA acts as an anti-depressive agent that causes structural brain changes.

A meta-analysis study based on 28 clinical trials provided evidence that EPA may be more efficacious than DHA in treating depression. Deficiency in DHA during early development may affect the central nervous system and could increase vulnerability to depression during adult life. Furthermore, intake of or supplementation with fish oil/ω-3 PUFAs protects youth (15–25 years) from major depressive disorder.

Maternal and Child Health

Association of ω-3 PUFAs exists with maternal health during pregnancy and child health. Omega 3 affects length of gestation, preterm birth, birth weight, peripartum depression, gestational hypertension/preeclampsia, postnatal growth patterns, visual acuity, neurological development, cognitive development, autism spectrum disorder, ADHD, learning disorders, atopic dermatitis, allergies, and respiratory disorders. National Institutes of health suggests that during pregnancy and breastfeeding, eating 8 to 12 ounces per week of fish and other seafood may improve the baby's health. However, it is important to choose fish that are higher in EPA and DHA and lower in mercury. Examples are salmon, herring, sardines, and trout. Breast milk contains DHA. Most commercial infant formulas also contain DHA.

Rheumatoid arthritis (RA)

The anti-inflammatory effects of high doses of omega-3 fatty acids provide symptomatic relief and also reduce cardiovascular risk in rheumatoid arthritis. Taking omega-3 supplements may help manage RA when taken together with standard RA medications and other treatments. People with RA who take omega-3 supplements may need less pain-relief medication, but it is not clear if the supplements reduce joint pain, swelling, or morning stiffness.

There are also health benefits of omega-3 consumption for healthy skin, reduced menstrual pain, improved bone & joint health.

Dietary recommendations:

The Institute of Medicine in the United States has given the AI for -linolenic acid being 1.6 grams/day for men and 1.1 grams/day for women. The American Heart Association (AHA) has made recommendations for EPA and DHA due to their cardiovascular benefits: individuals with no history of coronary heart disease or myocardial infarction should consume oily fish two times per week; and "Treatment is reasonable" for those having been diagnosed with coronary heart disease. For the latter the AHA does not recommend a specific amount of EPA + DHA, although it notes that most trials were at or close to 1000 mg/day. The European Food Safety Authority (EFSA) approved a claim "EPA and DHA contribute to the normal function of the heart" for products that contain at least 250 mg EPA + DHA. The World Health Organization recommends regular fish consumption (1-2 servings per week, equivalent to 200 to 500 mg/day EPA + DHA) as protective against coronary heart disease and ischaemic stroke.

Omega-3 Fortified Foods

Omega-3 supplementation in food has been a significant recent trend in food fortification. DHA and EPA are added to many foods that are commercially available, such as infant and pet formulae, and they are also supplemented in animal feed to incorporate them in consumer dairy, meat, and poultry products. The chief sources of EPA and DHA are fish oils or purified preparations from microalgae, which when added to foods, impart a fishy flavour that is considered unacceptable. This fishy flavour is completely eliminated by extensively purifying preparations of n-3 PUFA sources. While n-3 PUFA lipid autoxidation is considered the main cause of fishy flavour, the individual oxidation products identified thus far, such as unsaturated carbonyls, do not appear to contribute to fishy flavour or odour. Alternatively, various compound classes such as free fatty acids and volatile sulphur compounds are known to impart fishy flavour to foods. Identification of the causative compounds to reduce and eventually eliminate fishy flavour is important for consumer acceptance of PUFA-fortified foods.

Conclusion:

Omega 3 fatty acids have gained extreme popularity and importance over the years due to its wide array of health benefits. It is also quite often prescribed by physicians & nutritionists to take omega 3 supplements in order to be protected from various health risks. The scope of omega 3 in the coming years is going to be vaster as researchers still continue to explore more of its health benefits with substantial evidence and technological advancements so that it could be easily incorporated in foods. The current food supply already offers a wide variety of sources for dietary ALA, EPA, and DHA. Sustained innovations and a growing body of scientific evidence to support dietary recommendations for -3 fatty acids may help the public to achieve optimal health.

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BRAIN HEALTH: A MYSTERIOUS FRONTIER

AUTHOR

Mike Montemarano

Brain health category of nutraceuticals is one the most robust and quickly developing categories.

Certain nutrients and bioactive compounds have shown to benefit brain development in early life stages and to protect cognition, memory and executive function of people in senior years.

In addition new research to improve performance between ages 18 and 54 by handling stress for higher productivity has also led to some understanding.

However, knowledge of brain physiology is extremely limited as there are billions of neurons and trillions of pathways fundamental to cognitive processes.

Evidence however, suggests that when some ingredients are combined with healthy diet patterns, exercise and other healthy activities they could potentially optimise and protect one's faculties.

The market may be categorised based on applications, such as mood support, enhancing focus, reducing stress and improving sleep patterns. The ingredients are built into formulations to fit health application.

Cognitive health market is unique in supplements and functional foods industry. There are different target benefits, which interact and support one another. Ingredients and studies are used for attention, language, perception, memory, reasoning, mood, learning, problem solving and sleep.

Such categorisation helps provide further insight to the customer as to the anticipated health benefits while cognitive health remains a broad category. Ingredients are evaluated as cognitive health demands higher level of clinical substantiation and relies heavily on clinically proven safety and efficacy.

Another significant movement within cognitive health space is toward less conventional products with more nuanced applications. Many formulations for cognitive support are permeating into sports nutrition and weight management.

Some applications induce feeling of well-being and stress reduction over time, to address the source of stress-related overeating and snacking. In one trial among people with self-identified as frequent snackers, those who supplemented with saffron extract had fewer snacking incidents compared to placebo over two week trial.

The concept is that the notion that weight loss can be stressful time and that cognitive support can help maintain compliance with weight management programme. It also helps with providing daily experiential support. Successful weight management involves diet, exercise, and slow, consistent weight loss.

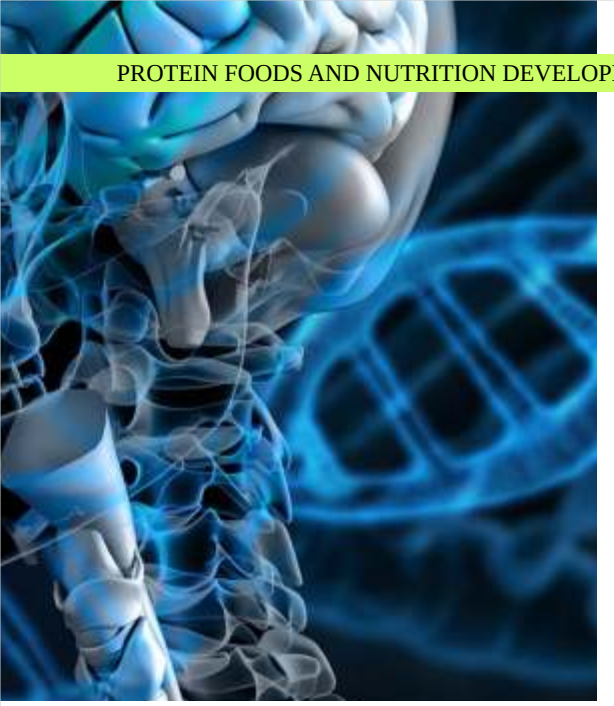
Brain weighs about 4% of a person's weight, but metabolises about 20% of caloric energy. Many supplements in sports nutrition for improving energy tend to have notable benefits for cognition.

Preliminary trial found chromium picolinate originally intended for blood sugar management has been shown to improve glucose metabolism in brain in seniors.

It reduced errors made in memory test and increased brain activation observed through fMRI brain scans while placebo group had no effect.

Peak Performance

Another criterion driving innovation in cognitive support lies in being able to think clearly, make decisions effectively, learn and remember things which are critical to success throughout life and in which many people struggle.



Brain health in general is becoming more important. In gaming area, reaction time, performance speed and mental stamina are extremely important. Clinical endpoints are shifting from academic measures to more real-life performance measures. This is more for those in early and middle adulthood.

Consumers want to know what an ingredient can do for them in a manner related to their own performance. They ask: are they able to complete tasks quicker; is their mental stamina increased; will they score higher on mental exercise etc.

One company has an ingredient comprised of two components bonded arginine silicate and inositol. This has been clinically substantiated using competitive gamers and subjecting them to series of tests on processing speed, energy and focus following supplementation and a full hour of gaming.

Gamers needing nutrition for eye health, mental endurance and improved general cognition, this brain health supplement would improve performance. It has been shown that it not only works fast but continues to provide brain benefits well afterwards without negatively affecting heart rate or blood pressure.

This ingredient was shown to significantly improve cognitive flexibility and reduction in errors on cognitive tests. Attention and reaction time improved even after 60 min after intake.

Peak performance is due to increasingly demanding lifestyles linked to knowledge economy. More than 4 in 10 do not get more than 6 hours of sleep in average in a study. Working from home makes it more difficult for consumers to turn off from business.

Concept of nootropics has become popular segment over last several years, driven primarily by younger consumers in their 20s and 30s. Competitive gaming in e-sports category and virtual learning at universities during pandemic have played important roles in popularising brain health supplements.

Studies into cognitive performance incorporate multifaceted approach between overall diet, proper supplementation to fill in nutrient gaps, and exercise. It is possible that an experimental group and placebo group will each be exposed to a range of healthy interventions in today's clinical trials on cognition.

In a 12-week study, airmen were given nutritional beverage containing protein, DHA, lutein, phospholipids, vitamin D, B vitamins, and muscle-promoting compound called HMB. Airmen whose active duties need great deal of physiological and psychological stressors, were able to improve strength, endurance, mobility and stability. They also saw increase in cognitive function, including episodic memory, information processing speed and fluid intelligence.

Some are wary of synthetic or semi-synthetic products being sold as brain health supplements. While common dietary ingredients are not of concern, heavy scrutiny lies on synthetics either being sold outright or appearing in products as adulterants.

For these reasons, industry is responding by focusing on natural ingredients with proven safety and giving heavy emphasis on R&D and clinical studies. Customer-focused companies are well aware of the challenges faced by regulatory scrutiny. They take care to maintain consumer trust, being clear about claims, focusing on safe manufacturing processes, and using natural ingredients.

More companies are taking safer approach with well-known natural ingredients, and so consumers are more receptive to communications about their validity. Ingredients suppliers must supply easily accessible information about branded ingredients and educate target markets on new research about their benefits.

For Synapsa (Bacopa extract) the company focused on claims substantiation and scientific communications, to provide an impartial review of the validity of science supporting the claims. Their dossier included comprehensive list of suggested claims and legal executive summary and reviews of substantiation of claims. They included both chronic long term and acute claims short term use of ingredients and general claims in area of cognitive health.

Lasting Protection

Association between nutrition and the risk of mild cognitive impairment (MCI) or conditions like Alzheimer's and dementia, is very attractive for researchers. Many meta-analyses highlight the potential role of several nutrients and bioactive compounds including flavonoids, carotenoids and specialised extract that play protective role for brain.

Beyond single ingredients, some dietary patterns and their outcomes are also key focus in nutraceuticals industry for healthy cognitive aging. It has been established that certain dietary patterns such as Mediterranean diet can prevent cognitive impairment. MCI affects 15 – 20% of seniors and it a top warning sign of increased risk for developing dementia and Alzheimer's disease.

A clinical trial focused on ketogenic diet found that shifting body's metabolism to prioritise ketones over glucose could be of some benefit. Specifically researchers found that ketogenic drink administered to people over 65+ at risk of age-related cognitive impairment, significantly improved performance tests for executive function. Other improvements were seen in memory, word recall and multi-tasking.

Gut-brain relation is also explored in cognition research where probiotics and prebiotics are used to manipulate enzyme, hormone and neurotransmitters by changing gut microbiome. In a Korean study consumption of seaweeds and mushroom fibres reduced instances of clinical depression and depressive symptoms.

Pandemic Priorities

Some priorities for brain support innovations for mood, sleep and cognitive support etc. have overlapped and will continue for long term. Prior to pandemic, 30-40% dietary supplements were to address concerns about anxiety and stress.

Pressure is mounting for cognitive support for mood and sleep. COVID-19 has affected the sleep patterns negatively and also become a significant source of stress. Mood, sleep and stress issues are far more important now than other cognitive health issues.

One ingredient Zembrin, an extract of a South African plant Sceletium tortuosum has shown to work along same neurological pathways that common anxiolytic drugs do. It is marketed to nutraceutical and functional food and beverage products supporting calmness, enhanced mood and improved cognition.

Long term stressors have lasting impact on the ability to think clearly, stay focused and the brain working optimally through the day. This supports the belief that widespread COVID-19 lockdown has induced brain fog. Memory problems are manifesting more among elderly people due to isolation and social interaction limitations.

Increasing mental health problems because of COVID-19 have made consumers to worry more about their cognitive health emphasising the demand for solutions to stress, sleep and more long-term cognitive issues. Consumers are accepting that mental well-being shapes overall health and can directly affect the immune system. Some of the health issues reported include feeling of fatigue, stress, difficulty sleeping, lack of concentration, general forgetfulness etc. Some long-term complications included periods of memory loss, feeling confused, difficulty understanding things and loss of words.

Bare Essentials

Research is highlighting how essential nutrients affect cognitive health and so formulators must refine them for specific applications.

Magnesium is available in many forms like citrate, chloride and oxide, but proprietary form magnesium L-threonat is shown to cross the blood-brain barrier more effectively.

B vitamins particularly B6, B9 and B12 are common ones in many brain health formulations. Although their deficiency is rare, much evidence supports claims related to regulation of brain signalling, providing energy toward the synthesis of new brain cells. Evidence is also adding to suggest that other B vitamins play critical roles in neuroprotection as well.

It has been shown recently that significant proportion of populations suffer from deficiencies of these vitamins. In absence of optimal diet, addition of entire B complex vitamins rather than a small sub-set at doses much larger than current recommendations would be a rational approach for preserving brain health.

Recently US Dietary Guidelines Advisory Committee (DGAC) recommended increase in daily recommended intake of choline especially among pregnant women and adolescents. Evidence is growing confirming vital role of choline in the development of brain areas involved in cognition, learning and memory with long-lasting consequences.

Acknowledgement of deficiency will play role in prioritisation of choline in nutrition space. Its influence in stem cell activity has also been shown during the fetal development, altering function of brain and spinal cord, influencing the risk of cognitive impairments and long term memory function. Although produced indigenously its requirements must be met through dietary intake.

Although severe deficiencies of vitamin E are rate people are not receiving adequate daily amounts. Association between inadequate intake of vitamin E and possible development of cognitive impairment later in life has been established. Primary role of this vitamin in cognitive health appears to be its ability as antioxidant to scavenge free radicals.

Specialty Compounds

Many amino acids and other chemicals hold significance in cognitive support market. Neurotransmitter GABA shows promise in cognitive support solutions. It has shown significant improvement in healthy adults in cognitive function particularly in memory and spatial cognition.

At higher dosage, additional benefits like assessment of working memory and sustained attention. GABA is believed to function broadly for relaxation, sleep and feelings of anxiety or stress.

Some other amino acids including creatine, leucine and BCAAs are also vital to brain function as transporters or precursors of neurotransmitters. Certain amino acids may improve short-term memory and focus.

Omega – 3s

Fatty acids EPA and DHA have been recognised for their critical role in brain development, cardiovascular health and other functions. New developments point to protective role over neurological health through life. Evidence about their benefit against diseases like Alzheimer's and dementia is mixed. It has also been suggested that omega 3 may counter effects of air pollution on brain.

Botanicals

Several compounds of plant origin have beneficial actions on brain health. Whether through supporting regulation of neurotransmitters, preventing oxidation or improving blood oxygenation levels that crosses blood-brain barrier, a range of benefits are seen.

Algal astaxanthin is considered important in brain health. In older subjects experiencing mild forgetfulness, it improves cognitive function and reduces age-related forgetfulness. It also reduces feelings of depression while decreasing mental fatigue and improving overall mood.

Another phytochemical resveratrol showed brain health benefits in postmenopausal women with improvement in various cognitive tests, and verbal memory. Found in berries, wine, and nuts, shows improvements to cerebrovascular circulation and bone mineral density is very appealing for seniors.

Pycnogenol, a proprietary extract with potent antioxidant properties obtained from bark of pine trees is useful as cognitive support ingredient. It reduces symptoms of mild cognitive impairment in seniors. It can also improve cognitive function in younger people. It shows improvement to mood, mental performance, sustained attention and oxidative stress.

Bacopa monnieri, a potent antioxidant herb influences higher order cognitive functions like learning and memory. Its extract offers nootropic support with clinical benefit for memory, mood, focus and learning as well as in health sleep cycles. Bacopa has been successful in sports nutrition with benefits in mental acuity, focus and freedom from distractibility, which are needed in performance based tasks.

Curcumin from turmeric has also been used for cognitive benefits impacting higher order thinking as well as in mood, memory and fatigue related to situations like pandemic. It has also showed promise for Alzheimer's disease.

There are dozens if not hundreds of compounds and ingredients showing support in various cognitive health benefits. Still the scientific understanding about their action is not clear as to the nutrient profiles and the brain. Overall consumer interest in products for development and aging of brain and offering competitive edge appears the prime driver of personalised nutrition.

(Condensed from Nutraceutical World April 12, 2020)

REGULATORY ROUND UP

By
Dr. N. Ramasubramanian,
Director, VR FoodTech,
n.ram@vrfoodtech.com

Dear Readers

Wish you all very happy and healthy 2021. Please find below FSSAI notifications, advisories, orders, etc since the last round up.

Final Gazette Notifications

Gazette notification amending and introducing standards across many food products and categories. A few of the salient points are

- Graded reduction in the upper limit of Trans fats in edible fats like margarine, hydrogenated vegetable oils, etc. The upper limit has been restricted to 2% and to be complied by 01 January 2022. The deadline through an order has been extended to June 2022.
- Amending the standards of vegetable ,fruit juices and TSS content of ready to serve fruit beverages
- New standards for egg products like egg powder, liquid egg, etc
- Standards for new fish products like fish sausage, crab meat, etc.
- Revised standard for baking powder.

Gazette notification amending the standards in alcoholic beverages

Standards for fortifying cereal products, bakery products and fruit juices with nutrients have been laid down. Fortification of these products is not mandatory.

Prohibition and Restriction on Sales regulation is amended permitting up to 2% the incidental presence of kesri dhal and other grains in gram and pulses.

Draft Gazette Notifications

It is proposed to amend Packaging and Labelling Regulation, 2018 permitting non transparent containers, but compatible with food, for packing drinking water. However, this has been already operationalized.

Advisories and Orders, Guidance Notes and Others

FSSAI has issued a clarification with regard to MRL of pesticides. The limits established for 213 pesticides in FSS (Contaminants, Toxins and Residues) Regulation, 2011 pertains to agricultural commodity and the resultant physically processed foods only. The directive further states that the limits are not applicable to “thermally and chemically processed” foods, though these terms are not defined. My understanding is – the limits are applicable – for example - wheat and atta and not bakery products. I welcome other interpretations.

FSSAI through a note has clarified that “No Objection Certificate” is not required (for obtaining license) in case food businesses of micro and small scale categories, drawing less than 10,000 litres per day.

Annual return like Form D1,etc for the year 2020 – 21 to be submitted only through online

Deadline for Animal Feeds to comply with BIS standards have been extended to 01 July 2021.

Import of food products for children with inborn error of metabolism has been extended up to 30 June 2021 but under some conditions.

RESEARCH IN HEALTH & NUTRITION

Boost to develop microalgae into health foods

Science Daily October 15, 2020

However, its widespread development has been hampered by the current limits of bio-imaging tools needed to allow easy, rapid and non-invasive evaluation of lipid conditions within microalgae. A novel protocol to detect lipid production in microalgae has been discovered at Flinders University by Mohsinul Reza, a PhD student under the supervision of Professors Jian Qin and Youhong Tang.

The study details the development of a novel protocol by using a novel aggregation induced emission (AIE) fluorescent bio-probe to detect the production of lipid drops from microalgae. Mr Reza has discovered the optimal condition to maximise the production of long-chain polyunsaturated fatty acid such as omega-3 fatty acids eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) in Euglena gracilis -- a species of lipid-producing microalgae that can biosynthesise multiple beneficiary compounds as food supplements for human health. "This technique enables us to visualise the distribution and quantity of lipid drops in live algae on a confocal microscope," says Professor Jian Qin. "This new method could screen the capacity of lipid droplet production in other algal species that have the potential as a source to produce healthy food for humans."

The new technique improves on traditional fluorescent probes currently used for lipid imaging, which often suffer from reduced photostability and difficulties in dye acquisition techniques that limits their usage for microscopic imaging. The new bio-probe DPAS (a lipid-specific AIE fluorogen that is synthesised from very cheap materials) could surpass the performances of the traditional fluorophore for lipid droplets staining in terms of photostability, rapid and easy sample preparation techniques. This new technique significantly eases the lipid study in this algal cell type. This fluorescent probe is also biocompatible and suitable for multicolour imaging that broadens the horizon of this dye for biological studies.

The researchers also observed cultural conditions that can produce higher amount of health beneficiary fatty acids, which suggests that promising bio-functional compounds could be available from culturing Euglena gracilis microalgae in the applied conditions. In details, the researchers tested five different treatments and analysed the results using DPAS and BODIPY (a well-known staining probe) to compare the results. They found that the presence of organic carbon in the form of glucose and deprivation of nitrogen and calcium from the algal culture enhanced lipid production in a dark condition.

Study underscores the gut-brain connection, shows hunger hormone impacts memory

A close study of the hunger hormone ghrelin shows that it affects how frequently animals eat; without it, they may forget when they last ate

Science Daily October 13, 2020

Animals and humans have the hormone ghrelin in their stomachs. Ghrelin tells animals, as well as humans, when they are hungry and helps regulate their metabolism, but scientists have never been certain how exactly it works.

To learn more about how ghrelin influences hunger, metabolism and memory, researchers at the USC Dornsife College of Letters, Arts and Sciences collaborated with international scientists on a study on rats. They disrupted the ability of the ghrelin hormone to communicate to the vagus nerve, a nerve that signals from the gut to the brain, and then monitored the impact on their feeding and cognitive behaviours. The rats were not anxious, but they began eating more frequently, said the study's lead and corresponding author Scott Kanoski, an Associate Professor of Biological Sciences at USC Dornsife.

The lack of ghrelin signalling, to the vagus nerve "not only disrupted their blood glucose regulation, but they also gained more weight," Kanoski said. "But it didn't seem to be affecting how much food they ate," he added. Instead, "they increased their frequency of eating, so that they consumed more meals and they compensated for that by reducing the size of their meals."

"We think that the increased eating frequency is related to their memory impairment. Memory from when you last ate will influence how soon you eat again. It led the rats in our study to eat sooner," said Kanoski.

Although the rats were able to remember where they had gotten food, they appeared to have forgotten that they had just eaten. Their stomachs were also slower to empty. "The animals were impaired in a certain type of memory, called episodic memory," said study co-author Elizabeth Davis who was a post-doctoral researcher in Kanoski lab at USC Dornsife. "This is the type of memory that helps you remember your first day of school, or what you ate for breakfast yesterday.?

Davis said scientists are trying to learn more about ghrelin signalling through the vagus nerve because it may help researchers develop better therapies for metabolic-related diseases such as obesity and diabetes or other metabolic diseases, as well as others such as epilepsy and Alzheimer's disease.
However, "a great deal of further research will be needed to uncover how manipulation of ghrelin signalling through the vagus nerve may be valuable in human medicine," said Davis, who recently left USC for a private pharmaceutical company after completing her post-doctoral degree in biological sciences.

Exposure to vitamin D in the womb might minimize risk of high blood pressure for children born to mothers with preeclampsia

Findings come from new analysis of large epidemiological dataset

Science Daily October 5, 2020

The findings, based on an analysis of data on 754 mother-child pairs in Massachusetts, suggest that higher vitamin D levels in pregnancy may help protect children born to preeclamptic women from developing high blood pressure. High blood pressure in childhood is associated in turn with hypertension and heart disease in adulthood.

"There is increasing evidence that cardiovascular disease risk is, to a great extent, programmed in the womb, and we now see that it may be vitamin D that alters this programming in a beneficial fashion," says study senior author Noel Mueller, PhD, an assistant professor in the Department of Epidemiology at the Bloomberg School. Preeclampsia, which can lead to strokes and/or organ failure, is a major cause of illness and death for pregnant women, and also is associated with a greater risk of stillbirth and preterm birth. Researchers have estimated that preeclampsia occurs in 2-8 percent of pregnancies worldwide. It is associated with maternal obesity, and the rate of severe preeclampsia in the U.S. has risen sharply since the 1980s.

At the same time, the rate of high blood pressure among children in the U.S. has risen by about 40 percent between 1988 and 2008. Studies have suggested that maternal preeclampsia may be a factor in that increase. Studies also have linked maternal vitamin D deficiency to a higher risk of preeclampsia, and have suggested that lower levels of vitamin D in adulthood or even early in life bring a greater risk of hypertension. "We wanted to know if vitamin D levels in the womb would modify this association between maternal preeclampsia and hypertension in childhood," says study first author Mingyu Zhang, a PhD candidate in Mueller's research group.

To investigate this question, the team analyzed data that had been gathered on 754 mother-child pairs from 1998 to 2018 in a large epidemiological study conducted at the Boston Medical Center in Massachusetts. The dataset included information on preeclampsia during pregnancy, tests on blood from the umbilical cord at birth, and the children's blood pressure from age 3 to 18. About 62 percent of the mothers in the study group were Black, and 52 percent were overweight or obese. Previous studies suggest that mothers who were Black or overweight or obese were at higher risk for preeclampsia. Darker-skinned people living in higher latitudes also are more likely to be deficient in vitamin D -- a cholesterol-derived molecule that is present in some foods but also is synthesized in skin with the help of ultraviolet light. Roughly ten percent of the women in the study group had preeclampsia, and the analysis revealed that their children on average had higher systolic blood pressure than the children born to non-preeclamptic mothers -- about 5 percentile points higher, when all the blood pressure readings were arranged on a 0 to 100 percentile scale.

Cord-blood vitamin D levels clearly modified these associations, and in a dose-related manner. Children in the lowest 25 percent range of vitamin D levels (lowest "quartile") were about 11 percentile points higher in blood pressure, on average, if their mothers had had preeclampsia, compared to children of non-preeclamptic mothers.

For children in the highest vitamin D quartile, there appeared to be no difference in average blood pressure if their mothers had had preeclampsia -- in other words, the results suggest that having relatively high vitamin D levels at birth, which could be achieved through dietary supplements, may completely mitigate the risk brought by preeclampsia. "If other epidemiological studies confirm these findings, then randomized trials would be needed to determine conclusively if higher vitamin D in mothers at risk of preeclampsia protects against childhood high blood pressure," Mueller says.

Bacterial metabolism of dietary soy may lower risk factor for dementia

Science Daily October 22, 2020

Their study, published today in the journal Alzheimer's & Dementia: Translational Research & Clinical Interventions, reports that elderly Japanese men and women who produce equol -- a metabolite of dietary soy created by certain types of gut bacteria -- display lower levels of white matter lesions within the brain.

"White matter lesions are significant risk factors for cognitive decline, dementia and all-cause mortality," said lead author Akira Sekikawa, M.D., Ph.D., associate professor of epidemiology at Pitt Public Health. "We found 50% more white matter lesions in people who cannot produce equol compared to people who can produce it, which is a surprisingly huge effect." To obtain this result, Sekikawa's research team measured equol levels within the blood of 91 elderly Japanese participants with normal cognition. Participants were sorted by their equol production status, and then six to nine years later underwent brain imaging to detect levels of white matter lesions and deposits of amyloid-beta, which is the suspected molecular cause of Alzheimer's disease.

The researchers found that while equol production did not appear to impact levels of amyloid-beta deposited within the brain, it was associated with reduced white matter lesion volumes. Sekikawa's team also discovered that high levels of isoflavones -- soy nutrients that are metabolized into equol -- had no effect on levels of white matter lesions or amyloid-beta when equol wasn't produced.

According to Sekikawa, the ability to produce equol from soy isoflavones may be the key to unlocking protective health benefits from a soy-rich diet, and his team has previously shown that equol production is associated with a lower risk of heart disease. As heart disease is strongly associated with cognitive decline and dementia, equol production could help protect the aging brain as well as the heart. Epidemiological studies in Japan, where soy is regularly consumed, have shown that dietary intake of soy isoflavones has been linked to a lower risk for heart disease and dementia. However, most clinical trials in America have failed to show this. Sekikawa believes that this discrepancy may be due to the microbiome -- 40-70% of Japanese harbor gut bacteria that can convert dietary isoflavones into equol compared to only 20-30% of Americans.

Sekikawa said that equol supplements could one day be combined with existing diet-based prevention strategies that appear to lower the risk of dementia, particularly the Dietary Approaches to Stop Hypertension (DASH) and Mediterranean diets.
Though Sekikawa hopes to evaluate the neuroprotective effects of equol supplements in a future randomized clinical trial, in the meantime, he urges caution to anyone who might be tempted to purchase equol supplements to stave off dementia. "This type of study always catches people's attention, but we cannot prove that equol protects against dementia until we get a randomized clinical trial with sufficient evidence," he said.

High flavanol diet may lead to lower blood pressure First study to use objective measure to look at 25,000 people's diet

Science Daily October 21, 2020

The findings, published in Scientific Reports, studied the diet of more than 25,000 people in Norfolk, UK and compared what they ate with their blood pressure.

In contrast to most other studies investigating links between nutrition and health, the researchers did not rely on study participants reporting their diet, but instead measured flavanol intake objectively using nutritional biomarkers -- indicators of dietary intake, metabolism or nutritional status that are present in our blood. The difference in blood pressure between those with the lowest 10% of flavanol intake and those with the highest 10% of intake was between 2 and 4 mmHg. This is comparable to meaningful changes in blood pressure observed in those following a Mediterranean diet or Dietary Approaches to Stop Hypertension (DASH) diet. Notably, the effect was more pronounced in participants with hypertension. Professor Gunter Kuhnle, a nutritionist at the University of Reading who led the study said "Previous studies of large populations have always relied on self-reported data to draw conclusions, but this is the first epidemiological study of this scale

to objectively investigate the association between a specific bioactive compound and health. We are delighted to see that in our study, there was also a meaningful and significant association between flavanol consumption and lower blood pressure. "What this study gives us is an objective finding about the association between flavanols -- found in tea and some fruits -- and blood pressure. This research confirms the results from previous dietary intervention studies and shows that the same results can be achieved with a habitual diet rich in flavanols. In the British diet, the main sources are tea, cocoa, apples and berries.

"The methodology of the study is of equal importance. This is one of the largest ever studies to use nutritional biomarkers to investigate bioactive compounds. Using nutritional biomarkers to estimate intake of bioactive food compounds has long been seen as the gold standard for research, as it allows intake to be measured objectively. The development, validation and application of the biomarker was only possible because of the long-term commitment of all collaborators. In contrast to self-reported dietary data, nutritional biomarkers can address the huge variability in food composition. We can therefore confidently attribute the associations we observed to flavanol intake."
An international team from the University of Reading, Cambridge University, the University of California Davis, and Mars, Incorporated studied 25,618 participants from the European Prospective Investigation into Cancer (EPIC) Norfolk study and found that the biggest difference was observed in participants with the highest blood pressure. This suggests if the general public increased its flavanol intake, there could be an overall reduction in cardiovascular disease incidence.

Hagen Schroeter, Chief Science Officer at Mars Edge, said "This study adds key insights to a growing body of evidence supporting the benefits of dietary flavanols in health and nutrition. But, perhaps even more exciting was the opportunity to apply objective biomarkers of flavanol intake at a large scale. This enabled the team to avoid the significant limitations that come with past approaches which rely on estimating intake based on self-reported food consumption data and the shortcomings of current food composition databases." The study was supported with an unrestricted grant from Mars, Incorporated, and two co-authors are employees of Mars. The study worked with the EPIC Norfolk population cohort, which acknowledges funding from the Medical Research Council and Cancer Research UK.

Tailored hospital food? NHS review urges shift to healthier and better-quality meals

26 Oct 2020 Nutrition Insight

The UK National Health Service (NHS) is set to provide healthier and better-quality meals to both patients and staff. The move follows an independent review of hospital food, led by a panel of expert advisers, who suggest a more tailored approach to patient nutrition.

Nutrition takes a central role to newly laid-out structure, with each trust responsible for overseeing patient, staff and visitor catering to receive a named food service dietitian. Notably, nutrition and hydration will also become a mandatory part of health and care professionals' training, including existing doctors' continuing professional development. "This pandemic has demonstrated more than ever the importance of good food and proper nutrition. We must all prioritize our health and be empowered to eat well, whether we're at home or in the hospital. This impressive report shows the way to good hospital food for all – patients, staff and visitors," says Matt Hancock, secretary of state for Health and Social Care. The review comes at the heels of the UK government announcing a £3.7 billion (US$4.8 billion) fund to build 40 hospitals across England by 2030. These will include a focus on 21st-century catering facilities, including restaurants, central kitchens, patient dining spaces and ward kitchens.

Boosting recovery

High-quality hospital food can improve staff well-being and speed up patient recovery, says the NHS. While 58 percent of patients rate hospital food as very good or good, 39 percent of hospital staff feel that food and catering facilities offered in their workplaces were poor, according to a 2019 NHS staff survey. With over 140 million meals served to NHS patients every year, and a further 1.25 million members of staff that require nourishing food and drink on shift, the review highlights the importance of improving both patient and staff satisfaction even further. Good food is essential for patient recovery, so this review could be "game-changing" in turning the tide on poor-quality food being served across English hospitals. But only if the recommendations are implemented in full, says Rachel Power, chief executive at The Patients Association.

A tailored approach to dietetics

According to the review, it is important to consider that a significant proportion of the patient population are nutritionally vulnerable. It is also vital that

hospitals pay close attention to the different needs of patients, staff and visitors, the review says. The different needs of patients are highlighted in the review, which explains that from diabetics to long-stay patients, nutritional needs are different and need to be monitored and tailored to the patients specific needs. Dietitians are best placed to help tailor the food offered to these different patients, drawing on their clinical and nutrition expertise. It is equally vital that there are suitable options on patient menus for certain special diets, including finger food and textured meals. A range of choices is necessary so patients staying more than one night can have variety, the review notes. Meeting the nutritional needs of the general hospital population and the particular needs of individuals, requires a dedicated dietitian to work with the catering department. However, according to the reviewers, clinical dietitians are sometimes perceived as having little to do with the food service.

The review therefore recommends that the hospitals should:
• Ensure there is a named food service dietitian in every trust responsible for overseeing patient, staff and visitor catering, with appropriate funding to support this role outside of clinical responsibilities.
• Dietetics and catering to work together toward healthier food for staff, in line with the Government Buying Standards and government dietary advice.
• Make nutrition and hydration a mandatory part of health and care professionals' training, including existing doctors' continuing professional development.
• Ensure food service is a mandatory part of the syllabus for dietitians.
• Develop an appropriate data-collection method on nutrition and hydration in all hospital settings, to ensure accurate monitoring and comparability.

Steps to better hospital food

The government will establish an expert group of NHS caterers, dietitians and nurses to take forward the recommendations made in the report and decide on the next steps.

These include:
• Upgrading hospital kitchens so a 24/7 service can be provided to everyone.
• Introducing digital menus and food ordering systems which can factor in a patient's dietary and cultural requirements and nutritional needs. This will improve communication between dietitians and caterers reduce food waste and provide patients with the right food for recovery.
• Agreeing with national professional standards for NHS chefs with mandatory professional development, including appropriate compulsory food hygiene and allergen training.
• Increasing the role of nurses, dietitians, caterers and staff well-being leads to overseeing food services so that nutritious meals are part of a patient's recovery plan.

"Across the NHS and in the 40 new hospitals we are set to build, I want to ensure that we deliver really good hospital food. Alongside our new obesity strategy to improve the nation's diet, the NHS is leading by example when it comes to public health," Hancock concludes.
By Kristiana Lalou

Vitamin K deficiency pegged as "potential missing link" in COVID-19 pathogenesis

08 Oct 2020 Nutrition Insight

A new study review has positioned vitamin K metabolism as the "potential missing link" between lung damage and thrombo-embolism – two of the most serious outcomes observed in COVID-19 patients.

The research team proposed that pneumonia-induced vitamin K depletion leads to a decrease in activated Matrix Gla protein (MGP) and protein S, aggravating pulmonary damage and coagulopathy, respectively. "This kind of discovery is extremely important. We intend to take responsibility in increasing general understanding around the importance of vitamin K. We contacted the scientific team and offered to support further research," Tryvge Bergeland, vice president of science at Kappa Bioscience tells NutritionInsight.

Lead co-author Dr. Rob Janssen from the Department of Pulmonary Health at the Canisius Wilhelmina Hospital in Nijmegen, The Netherlands, tells NutritionInsight that he and his colleagues were "very surprised" to find severely reduced vitamin K status in COVID-19 patients. "When I first brought plasma samples of our COVID-19 patients to [the School for Cardiovascular Disease] CARIM in Maastricht, I would have expected that vitamin K levels were reduced, but the severity of the deficiency surprised me."
"Furthermore, I found it surprising that activation of factor II by vitamin K in the liver – stimulator of clotting – was hardly affected, whereas activation of MGP in lungs and blood vessels was severely compromised. There is a specific deficiency in COVID-19 patients outside the liver, whereas vitamin K status in the liver is hardly compromised," he flags.

Pairing vitamin D with K

The study findings of severe vitamin K deficiency in COVID-19 patients may also impact the vitamin D sector, says Dr. Janssen.
Many experts have called for vitamin D supplementation to be added to help fight against COVID-19. However, this new study review points

to "conflicting" research results. The review found that vitamin D administration in a state of vitamin K deficiency may endanger pulmonary and vascular health. Its supplementation has been associated with premature mortality in vitamin K-insufficient stable kidney transplant recipients.
"Unfortunately, it is not generally appreciated that vitamin D may exacerbate vitamin K deficiency," notes Dr. Janssen. "Particularly in COVID-19 patients who are already vitamin K deficient, high-dose vitamin D supplementation may further deplete vitamin K stores."
"It may therefore be prudent to first supplement vitamin K in invariably vitamin K-insufficient COVID-19-hospitalized patients and to start vitamin D supplementation in those who are vitamin D-deficient only when extra-hepatic vitamin K status has been restored," the review reads.

Dr. Janssen, therefore, advises individuals who do not use vitamin K supplements as anticoagulant medications and are using vitamin D supplementation to combine vitamin D with K. Bergeland notes: "This study raises the important point that co-supplementation with vitamin K2 along vitamin D might be more beneficial." Industry has been catching on the trend of pairing the two vitamins. US-based Arthur Andrew Medical has unveiled KD Ultra, a dietary supplement combining vitamin D3 with the "most absorbable" full spectrum blend of vitamin K2. Kappa Bioscience, manufacturer of K2 MK-7, highlighted in previous research how D3 and K2 function more effectively in the presence of the other.

Future research prospects

Whereas vitamin D status assessment is generally available, vitamin K status assessment is rarely performed. Moreover, there are very few laboratories that have an assay to quantify vitamin K status.
Bergeland further adds that vitamin K1 deficiency is extremely rare and vitamin K2 deficiency, even if common, does not result in immediate symptoms. These are some of the main reasons that have led to the role of vitamin K in fighting COVID-19 going "largely unexplored." "Medical doctors and researchers associate vitamin K only as an activator of clot-promoting factors in the liver. They usually don't realize that vitamin K also activates other proteins, such as MGP in lungs that protect against lung damage and protein S in the blood vessel walls that protect against thrombosis," Dr. Janssen explains. He also stresses that reported false claims that vitamin K increases thrombosis risk are bound to prevent the widespread use of the vitamin.

The study authors consequently identify a need for further experimental evidence to link vitamin K deficiency with the pathology of COVID-19. They also hope to determine whether vitamin K supplementation has a place in treatment protocols. Notably, in April, better vitamin K status in patients with COVID-19 was linked to improved health outcomes, compared to patients with poor vitamin K status. At the moment, Kappa Bioscience is now initiating scientific collaborations in Europe and the US to generate more data and increase our understanding on this "extremely important topic," concludes Bergeland.
By Anni Schleicher

Higher egg intake linked to lower stroke risk in Asia, but not in North America and Europe: Meta-analysis

By Guan Yu Lim 14-Oct-2020 – Food Navigator Asia

A systematic review and meta-analysis involving more than one million participants worldwide found that higher egg consumption is linked to a reduced probability of stroke among Asian consumers, but not in North America or Europe.

Studies on egg consumption and stroke risk have produced inconsistent results so far, hence in this study, researchers in China included dose-response and geographic regions, with the findings published in the Frontiers in Nutrition journal.In this meta-analysis, 4,391 studies were taken from databases (Pubmed, Embase, Cochrane) which was narrowed to 16 studies involving 24 prospective cohort studies (1,387,653 participants). The studies were conducted across the world, from USA, China, Japan, Iran, Finland, UK and Sweden.

Most of the studies used a food frequency questionnaire (FFQ) whether interviewer-administered or self-administered to assess egg consumption. 50g of egg intake was defined as one serving size or one egg. Relative risk (RR) of stroke for the highest versus the lowest levels of egg intake was calculated.

The study revealed that there was no significant association between a higher intake of egg versus a lower intake of egg with stroke risk (RR=0.92).
However, when the data was analysed by geographic region, the association was more pronounced in Asia(R=0.83) but not in North America (RR=0.95) or Europe (RR=1.02).
Higher egg consumption was attributed to a reduced probability of stroke in Asia compared to the Western regions.
In USA, frequent egg consumption was also associated with unhealthy behaviours such as higher consumption of red meat or processed meat, less intake of skim milk, insufficiency of vegetables or fruits, and lower physical activity.

Thus, the finding of regional differences suggested that other dietary patterns may attenuate the association between egg consumption and stroke risk, with the exception of possible genetic and environmental factors. In terms of dose-response, egg intake between 50 to 200g/week (approximately one to four eggs per week) was associated with a decreased risk of stroke.

But an increased risk of stroke was associated with increasing egg intake of over 300g/week (six eggs per week). Researchers proposed several possible protective biological mechanisms of egg consumption against stroke. "Firstly, increased high-density lipoprotein cholesterol derived from egg phospholipids plays an anti-atherosclerosis role by promoting cholesterol metabolism, "Second, the ovotransferrin peptide in egg white has a similar antihypertensive effect by preventing vascular smooth muscle remodelling,
"Third, eggs are also rich in lutein and zeaxanthin, which have antioxidant and anti-inflammatory effects,
"Finally, some components in the egg such as vitamins and zinc may have protective effects against stroke."

However, egg intake remains a controversial topic as eggs have a multifaceted effect.
The primary concern related to egg consumption is the adverse effect of high levels of dietary cholesterol in eggs (an egg contains approximately 175mg cholesterol). Recent findings reported that moderate egg consumption (one egg daily) was able to reduce the ratios of total cholesterol/high-density lipoprotein cholesterol and low-density lipoprotein cholesterol/high-density lipoprotein cholesterol, but excess egg consumption (more than one egg daily) leads to higher ratios of total cholesterol/high-density cholesterol and low-density cholesterol/high-density cholesterol.

The current findings of increased stroke risk in those who consumed more than six eggs per week, suggest that egg intake should be restricted, but an accurate threshold range should be further explored. Researchers further acknowledged that their study had several limitations. "Due to the nature of observational studies, residual confounding factors and measurement errors generated from the original research could mask the true association. For example, data on egg consumption habits were collected using a food questionnaire at baseline, and most of the included studies did not consider the changes in egg consumption during the follow-up years." In addition, "because the included data were from East Asia, Northern America, and Europe, future research in other geographic regions is needed to confirm this finding." "Our study may have public health implications. The new 2015 American and 2016 Chinese recommended eggs as part of a healthy diet."

China's public health guidelines recommend an intake of 40 to 50g of egg daily for healthy adults, although no data was specified in USA's guidelines. They concluded that their findings suggest eggs be part of a healthy diet and may possibly reduce the risk of stroke, but the amount of egg intake should be limited.

Study: Early introduction of wheat in high doses may prevent celiac disease in young children

By Mary Ellen Shoup
12-Oct-2020 – Food Navigator USA

Introducing high doses of gluten into an infant's diet beginning at four months of age could prevent them from developing celiac disease, one study suggests – although further research is needed, say researchers.

Researchers investigated the effects of gluten alongside breast feeding, from the age of four months. The results were compared to children who avoided allergenic foods and consumed only breast milk until age six months. In the results from the EAT (Enquiring About Tolerance) study, published in JAMA Pediatrics late last month, researchers from King's College London, Guy's and St Thomas' NHS Foundation Trust, St George's, University of London, and Benaroya Research Institute, Seattle, found that the early introduction of high-dose gluten maybe an effective prevention strategy against developing celiac disease, an autoimmune disease whereby eating gluten (a protein found in wheat) causes damage to the small intestine.

The Celiac Disease Foundation estimates that 1 in 100 people worldwide are affected by celiac disease, and that 2.5 million are undiagnosed. There are currently no strategies to prevent celiac disease and treatment involves long-term exclusion of gluten from the diet, noted researchers, adding that even very small amounts of gluten in the diet of those with celiac disease can cause damage to the lining of the gut, prevent proper absorption of food, and result in symptoms including bloating, vomiting, diarrhea, constipation, and fatigue.

According to researchers, previous studies have explored the early introduction of gluten in infants but have varied in the amount of gluten consumed and timing of introduction. For instance, current products markets as food allergen introduction products for infants contain a variety of common food allergens but in much smaller doses.

"This is the first study that provides

evidence that early introduction of significant amounts of wheat into a baby's diet before six months of age may prevent the development of celiac disease. "This strategy may also have implications for other autoimmune diseases," commented lead author Professor Gideon Lack, who led the 2015 LEAP study, which showed that if you deliberately expose infants at high risk of peanut allergy (babies with severe eczema, an allergy to egg, or both) to peanuts in early life, they are far less likely to develop allergies.

Infants in the intervention arm (488 infants) of the EAT study were given 4g of wheat protein a week (in the form of two wheat-based cereal biscuits) starting at four months of age. Researchers tested 1,004 children for anti-transglutanimase antibodies, an indicator of celiac disease, at three years of age. Those with raised antibody levels were referred for further testing by a specialist.

The results showed that among children who delayed gluten introduction until after six months of age, the prevalence of celiac disease at three years of age was higher than expected – 1.4% of this group of 516 children. In contrast, among the 488 children who introduced gluten from four months of age, there were no cases of celiac disease.

"Early introduction of gluten and its role in the prevention of celiac disease should be explored further, using the results of the EAT Study as the basis for larger clinical trials to definitively answer this question," said study author Dr. Kirsty Logan, researcher in pediatric allergy at King's College London.

L-carnitine supplementation beneficial for reducing waistline and blood pressure – Meta-analysis

By Tingmin Koe
01-Oct-2020 – NutraIngredients Asia

L-carnitine supplementation has been shown to help reduce waist circumference and systolic blood pressure among people suffering from a range of health conditions, including diabetes and non-alcoholic steato-hepatitis, according to a meta-analysis.

However, there was no significant effect seen on fasting blood sugar (FBS), triglyceride (TG), and high-density-lipoprotein-cholesterol (HDLc) when comparing the intervention and placebo groups. L-carnitine is a non-protein amino acid found in meat, fish, milk, and dairy products. It plays a role in lipid metabolism by transporting long-chain fatty acids into the mitochondria and is a popular supplement for weight loss and fat burning.

The meta-analysis, published in Nutrients, was conducted by researchers from the Sungshin Women's University and Gyeongin Regional Korea FDA. Said to be the first meta-analysis to investigate the effect of L-carnitine supplementation on the biomarkers of metabolic syndromes, the analysis examined nine RCTs that were published before February this year. The researchers searched for the RCTs from a number of databases, including PubMed, EMBASE, Cochrane,and CINAHL. An RCT was included in the analysis if it examined at least one of the biomarkers, including waist circumference, blood pressure, FBS, TG, or HDLc. Eventually, nine RCTs conducted in Iran, Italy, China, and Japan involving a total of 508 participants were included in the meta-analysis. The participants had underlying health conditions, including diabetes, non-alcoholic steato-hepatitis, knee osteoarthritis, or were undergoing hemo-dialysis.

In the RCTs studied, the dose of L-carnitine administered varied between 0.75g/day and 3g/day for eight to 24weeks. Most of the interventions last ed for 12 weeks and most require the subjects to take in L-carnitine at a dose of2g/day.

The meta-analysis showed that L-carnitine supplementation could significantly reduce waist circumference. Involving 155 subjects, two of the nine RCTs showed that there was a mean difference of 1.89cm in the waist circumference between the intervention and control group. There were also two RCTs with a total of 66 participants which showed that L-carnitine supplementation was related to a mean decrease in systolic blood pressure by 7.41mmHg.

The analysis was supported by grant from the National Research Foundation of Korea grant. The intake of L-carnitine did not lead to a significant difference in the fasting blood sugar, triglycerides, and high-density lipoprotein-cholesterol between the intervention and placebo groups. Yet, a significant change was seen in the fasting blood sugar level before and by the end of the study in the intervention group. For instance, in four of the RCTs involving 321 subjects, the level of fasting blood sugar dropped by10.74mg/dL, a significant change where p was less than 0.05. Another finding was that a higher dose of L-carnitine was more effective in reducing fasting blood sugar and triglycerides levels. As seen from three RCTs where the intervention was at least one gram of L-carnitine per day, there was a mean drop of 11.41 in fasting blood sugar level (p-value of less than 0.0001).

Whereas in another two RCTs where the intervention was less than one gram of L-carnitine per day, there was a mean increase of 0.89 in fasting blood sugar level.
Similarly, at least one gram of L-carnitine per day reduced triglycerides level by 29.85 (p-value of 0.05), while a dose of less than one gram only saw triglycerides level dropped by 3.8. "In the subgroup analysis based on L-carnitine dose, when the treatment dose was more than 1 g/d, fasting blood glucose, triglycerides, and high-density lipoprotein-cholesterol were significantly improved. However, when the L-carnitine dose was under 1 g/d, there was no change. These results suggest that at least 1 g/d of L-carnitine should be consumed to improve metabolic syndrome biomarkers," the researchers said.

However, the supplementation of L-carnitine at ve gram or more per day has been reported to side effects such as diarrhoea. This is also linked to the production of trimethylamine-N-oxide, which in turn leads to an increased risk of atherosclerosis. The researchers cautioned that a dosage of two to three grams of L-carnitine per day is recommended.
The researchers said there was a lack of scientific evidence to support the appropriate dosage levels of L-carnitine amongst Koreans. For instance, there was not enough information on the daily intakes in Koreans, dose–response results, or a comparison of intakes and body stores. Moreover, as L-carnitine is a non-essential nutrient, the National Health & Medical Research Council has also not considered a dietary reference intake for the nutrient.
On the other hand, the researchers also pointed out a number of limitations of the meta-analysis. One of which was that they only investigated the association between synthetic L-carnitine supplements, without considering sources from food, and the biomarkers of metabolic syndrome.

Two trials support GABA's cognitive health benefits for healthy adults

By Stephen Daniells
10-Aug-2020 - NutraIngredients

Supplementation with GABA (gamma-amino-butyric acid) may boost a range of cognitive measures, including memory and spatial cognitive function, according to two new studies from Japan.

The twin randomized, double-blind, placebo-controlled, parallel-group clinical studies used doses of 100 and 200 mg of GABA daily given to two separate groups of 60 healthy adult subjects aged over 40. The results showed that 12 weeks of GABA supplementation at 100 mg per day led to significantly better tests scores for visuo-spatial/construction faculty and memory, and when the dose was doubled to 200 mg, additional improvements were recorded. These additional benefits include improvements in non-verbal reasoning, working memory, and sustained attention, according to data published in the journal Japanese Pharmacology & Therapeutics. GABA is a naturally-occurring amino acid and key inhibitory neurotransmitter found in human cells. GABA can be found in a range of foods, with certain fermented foods particularly popular in East Asia like kimchi having especially high concentrations.

The two new studies both used the PharmaGABA-branded ingredient from Pharma Foods International, which produces its GABA from the fermentation of Lactobacillus hilgardii using a proprietary process to over 80%purity, said the company. The ingredient PharmaGABA, which is self-affirmed GRAS in the US, reportedly commands over 80% of the Japanese market. The twin studies also examined quality of life for the participants for both separate study cohorts and found

improvements in GABA groups, compared to their placebo arms. Specifically, quality of life measures for physical functioning, vitality, and mental health were improved in the GABA groups.

The higher dose study also found that GABA increased IGF-1 (insulin-like growth factor 1), which has been reported to have activating effects in the brain. This is an important observation given that GABA has been reported to not pass the blood-brain barrier.
"The mechanism by which GABA improved or maintained cognitive function is guessed that GABA acts on the pituitary GABA receptor to promote GH [growth hormone] secretion, GH promoted IGF-1 production in the liver, andIGF-1 enters the brain and activate the brain function," wrote the researchers.

Study supports efficacy of eggshell membrane plus fish oil for joint health benefits

By Stephen Daniells
05-Aug-2020 - NutraIngredients

A combination of eggshell membrane plus fish oil may provide "rapid relief" of joint pain and stiffness after exercise

for healthy adults, according to results of a randomized, double-blind, placebo-controlled study.

Two weeks of supplementation with MOVE3 formulated with 500 mg eggshell membrane (Stratum's NEM brand eggshell membrane) with 1,500 mg fish oil concentrate (KDPharma's KD-Pür brand concentrated omega-3 EPA/DHA from fish oil) led to significantly less pain immediately after exercise and still 12 hours later, compared to placebo.

In addition, participants receiving MOVE3 also had improved levels of stiffness and significantly reduced levels of a marker of cartilage degradation called C-terminal cross-linked telopeptide of type-II collagen (uCTX-II), report scientists from ESM Technologies, QPS Bio-Kinetic, KD Pharma, and Clinical Research Consulting in the International Journal of Physical Medicine and Rehabilitation.

Commenting on the study, Adam Ismail, chief strategy officer of the KD Pharma Group and co-author on the new paper, said: "The body of science supporting exercise and recovery benefits for both Omega-3 and NEM continues to grow, but this study is unique because it demonstrates benefits in healthy people consuming the MOVE3 formulation after they have exercised.

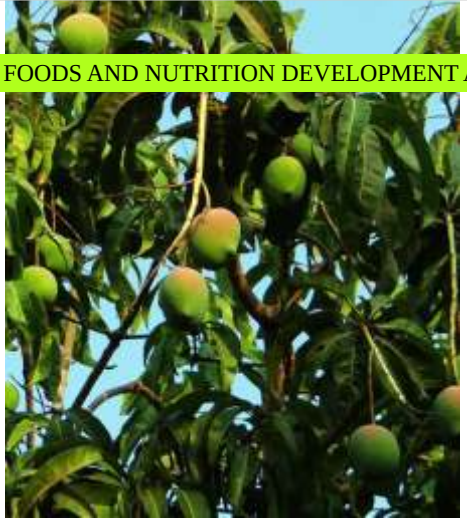
"For sports nutrition products, it is important that consumers be able to feel the benefit, and the fact that we saw a significant improvement compared to placebo means the subjects not only felt the impact of MOVE3 but observed the effects in a rapid timeframe."

The researchers 85 healthy men & women aged between 40 and 75 to participate in their randomized, double-blind, placebo-controlled study. The participants performed a step exercise regimen (40 to 100 steps per leg) on alternating days for two consecutive weeks, and were randomly assigned to receive either the MOVE3 supplement or placebo for the two weeks.

Results showed that participants in the MOVE3 group experienced statistically significant reductions in levels of CTX-II of 12.9% and 17.7% after 1 and 2 weeks, respectively. "uCTX-II level in the ES-OM3 group was reduced by 12.4% but increased by 5.5% in the placebo group after 2 weeks of treatment and exercise," wrote the researchers. "Like eggshell membrane, omega-3 fatty acid PUFAs mediate the expression of pro-inflammatory eicosanoids and cytokines, increase cartilage GAG content, and modify cartilage turnover. "The present study clearly demonstrates that ES-OM3 has the potential to reduce the level of CTX-II and prevent or delay cartilage degradation processes after exercise."

In addition, compared with placebo, the MOVE3 group had significantly less joint pain immediately after exercise (28.6% lower) at 1 week, and 12 hours after exercise at 1 week (46.7% lower). Stiffness 12 hours after exercise at 1 week was also significantly lower in the MOVE3 group, said the researchers.

Kevin Ruff, PhD, senior director of scientific & regulatory affairs for Stratum Nutrition and lead researcher for the study, commented: "Conducting this clinical trial in exercising healthy adults will allow brands to make label claims relating to joint pain and stiffness and even cartilage protection. This is an additional benefit that MOVE3provides beyond any other combination product on the market."



Mango leaf extract shows wide-ranging brain benefits

By Nikki Hancocks
13-Aug-2020 - NutraIngredients

A single dose of the mango leaf extract Zynamite can boost a wide range of brain functions for at least five hours, according to a new double-blind, placebo-controlled cross-over study.

Extracts made from the leaves of the mango food plant (Mangiferaindica L., Anacardiaceae) have a long history of medicinal usage. Literature demonstrating functional benefits following polyphenol consumption, and previous rodent and pilot human studies, suggest that a mango leaf extract with high levels of the polyphenol mangiferin may exert beneficial effects on human brain function, including the enhancement of cognitive function. The current study, published in Nutrients, investigated the effects of a single dose of mango leaf extract, standardised to contain >60% mangiferin (Zynamite), on cognitive function and mood - making it the first concerted investigation into the effects of mangiferin on human cognitive function.

Led by senior author Professor David Kennedy, Director of the Brain, Performance and Nutrition Research Centre at Northumbria University, the study adopted a double-blind, placebo-controlled cross-over design in which 70 healthy young adults (18 to 45 years) received 300 mg Zynamite and a matched placebo, on separate occasions, separated by at least 7 days. The team assessed the participants' cognitive function and mood before they took the day's treatment to establish their baseline performance and then they repeated the assessment 30 min, 3 hours and 5 hours after consuming the treatments.

Using the COMPAS test, the team measured different aspects of cognitive function - this provided composite scores that reflect the participants' ability to concentrate, and the functioning of aspects of their memory. The team was surprised to find that participants showed marked improvements in all aspects of cognitive function after one dose of the supplement.

"The results were particularly pleasantly surprising because the benefits to accuracy were seen right across tasks –suggesting a very general boost to brain function," said Prof Kennedy. "Participants performed more accurately on the tasks that measure concentration and memory, and were better at performing each of the mentally demanding tasks than after the placebo – these benefits were also seen across the time they stayed in the laboratory after taking a single dose. Clearly better concentration and improved memory are going to be important to all sorts of everyday mental functions."

Julia Wiebe, PhD., R&D Director at Nektium Pharma added that credibility of the results of the study are enhanced by the academic team involved. "Professor Kennedy is one of the world's leading experts on the effects of botanicals and natural compounds on the CNS, and we are grateful to him and his excellent team at the Brain and Nutrition Research Centre, University of Northumbria for designing the clinical study protocol and for conducting the study," she adds.

Nektium Pharma produced the Mangifera indica extract and sponsored the study. However, no representative of Nektium Pharma had any role in the running of the study, or the analysis, or the interpretation of the data. Made by the Spanish nutracuticals firm Nektium, Zynamite is patented botanical extract clinically documented to provide significant sustained boosts to mental and physical performance. Studies have shown Zynamite activates brain waves in almost identical pattern to caffeine – but using a different mechanism that doesn't cause any of the side-effects caffeine does. The supplement is sourced by selectively pruning cultivated mango trees in the tropics meaning it is a by-product of mango production and is ecologically sustainable.

Danish population study further bolsters case for vitaminK2

By Hank Schultz
19-Aug-2020 - NutraIngredients

A new study on cardiovascular health using a protein as a biomarker has bolstered the evidence backing the notion that the benefits of vitamin K2 are so important that the substance should have its own RDI, a Norwegian supplier says.

The new study was published online ahead of print and is scheduled to be included in the September issue of the journal Clinical Biochemistry. It was written by a team of researchers from several hospitals, institutes and universities in Denmark. The researchers looked at the levels of inactive matrix Gla protein (MGP), a known biomarker for K-vitamins status, and cardiovascular risk. MGP is involved with the mobility of calcium into and out of the bone matrix. Calcium supplementation has been shown to be important for bone health, but has in some cases been associated with arterial calcification. But recent research has shown that having enough vitamin K2 on hand activates enough MGP to keep this from happening.

Thus, the Danish researchers postulated that MGP could be used as a handy biomarker for vitamin K2 status. The hypothesis was that a correlation would be found between levels of the inactive form of this protein and greater risk of cardiovascular disease. To test the hypothesis the researchers examined data from a large population cohort. The researchers tested for levels of this protein in 491 subjects of a large Danish population survey. Blood was drawn from 229 men and 262 women. The subjects ranged in age from 19 to 71.

The researchers concluded there was a strong correlation between a higher level of inactive MGP and a greater risk of cardiovascular disease. "Increased plasma dp-ucMGP levels were positively associated with cardiovascular risk factors such as arterial stiffness (as reflected by increased ePWV), hypertension, obesity, and history of CVD events. These findings support that dp-ucMGP is a biomarker of cardiovascular risk and lend support to the hypothesis that vitamin K status plays a role in vascular calcification and risk of CVD… Prospective studies could establish the causal direction of these associations and whether increased vitamin K intake represents a preventive measure against vascular calcification and CVD-risk," they said. "Different studies have found an association between dietary vitamin K intake and CVDs. Particularly menaquinone (K2) is associated with a decreased risk of coronary heart disease and all-cause mortality," the researchers added.

Norwegian supplier Nattopharma, which manufactures a form of vitamin K2 branded as MenaQ7 has

worked to build the case for an RDI for a number of years. That effort is being funded in part by a so-called INTRICAREgrant awarded to NattoPharma's International Research Network by the European Union within the Horizon2020 Marie Sklodowska-Curie research and innovation program.
Two review papers were published recently under the grant, which serve to bolster the evidence package for the menaquinone-7 form of vitamin K, known as vitamin K2. Vitamin K has long been known for its role in blood coagulation, but K2 has a range of benefits in cardiovascular and bone health that go far beyond that, said Eric Anderson, senior vice president of marketing for NattoPharma.

"Vitamin K has always been accepted as the coagulation vitamin," Anderson told NutraIngredients-USA. "We are trying to build a body of evidence to make a case for an RDI on K2 based on its other effects."

The most recent Danish paper, which is not part of the INTRICARE grant, will further add to that body of research, said Nattopharma chief science officer Dr Hogne Vik, MD as well as help to clear up some misconceptions about this family of vitamins.

"It still remains a common misunderstanding that vitamin K, in general, impacts arterial calcification, when in fact it is Vitamin K2 that is available beyond the liver to support bone and cardiovascular health," says Dr. Hogne Vik,NattoPharma Chief Medical Officer. "Our studies with MenaQ7 have shown that K status was more efficiently improved in adults as well as children with supplementation of Vitamin K2 as MK-7. Both of NattoPharma's cardiovascular intervention trials showed improved vascular health with just 180mcg – our 3-year study cardiovascular study in healthy postmenopausal women showed improved arterial flexibility, and now our 1-yearstudy in men and women showed a significant decrease in dp-ucMGP," he said.

Could excessive sugar intake contribute to aggressive behaviours, ADHD, bipolar disorder?

New peer-review paper looks at evolution and current Western diet to help explain manic behaviours

Science Daily October 16, 2020

University of Colorado Anschutz Medical Campus New research suggests that conditions such as attention deficit hyperactivity syndrome (ADHD),bipolar disorder, and even aggressive behaviours may be linked with sugar intake, and that it may have an evolutionary basis.

New research suggests that conditions such as attention deficit hyperactivity syndrome (ADHD), bipolar disorder, and even aggressive behaviours may be linked with sugar intake, and that it may have an evolutionary basis. The research, out today from the University of Colorado Anschutz Medical Campus and published in Evolution and Human Behaviour, presents a hypothesis supporting a role for fructose, a component of sugar and high fructose corn syrup, and uric acid (a fructose metabolite), in increasing the risk for these behavioural disorders.

"We present evidence that fructose, by lowering energy in cells, triggers a foraging response similar to what occurs in starvation," said lead author Richard Johnson, MD, professor at the University Of Colorado School Of Medicine on the CU Anschutz Medical Campus.

Johnson outlines research that shows a foraging response stimulates risk taking, impulsivity, novelty seeking, rapid decision making, and aggressiveness to aid the securing of food as a survival response. Over-activation of this process from excess sugar intake may cause impulsive behaviour that could range from ADHD, to bipolar disorder or even aggression.

"While the fructose pathway was meant to aid survival, fructose intake has skyrocketed during the last century and may be in overdrive due to the high amounts of sugar that are in the current Western diet," Johnson adds.

The paper looks at how excessive intake of fructose present in refined sugars and high fructose corn syrup may have a contributory role in the pathogenesis of behavioural disorders that are associated with obesity and Western diet.

Johnson notes, "We do not blame aggressive behaviour on sugar, but rather note that it may be one contributor." Johnson recommends further studies to investigate the role of sugar and uric acid, especially with new inhibitors of fructose metabolism on the horizon. "The identification of fructose as a risk factor does not negate the importance of genetic, familial, physical, emotional and environmental factors that shape mental health," he adds.

FOOD SCIENCE & INDUSTRY NEWS

Mobility industry targets younger consumers and "heterogeneous" seniors worldwide as part of wider immunity strategy

28 Oct 2020 Nutrition Insight

Physical exercise is crucial to balancing a healthy immune system – a major concern throughout the COVID-19 pandemic. Increased attention on well-being has brought mobility health concerns to the fore. Moreover, the mobility sector is increasingly including younger adults, diverging from the traditional target consumer group of seniors who seek to address their muscle aches, joint and bone health.

NutritionInsight speaks with industry experts about mobility finding its place in the ever-growing immunity scene, reassessing a traditional consumer group in terms of age demographics and geographical regions, as well as burgeoning trends.

Fitting mobility in with immunity

The pandemic has rapidly shifted consumers' attention to their immune health – resulting in an explosion in the sector, says Jaume Reguant, healthcare director at Bioiberica. Part of strengthening the immune system is physical exercise and keeping fit, he highlights. "One study showed that consumer interest in exercise in Australia, the UK and the US surged at the start of lockdown and remains at higher levels than before the pandemic. Mobility, of course, plays an essential role in keeping healthy and active in the long-term." As such, it's not that mobility needs to keep up with the immune health trend, adds Stephane Vouche, marketing manager, at Lonza Capsules & Health Ingredients. Instead, consumer interest in immune health is "growing in tandem" with interest in overall well-being, including maintaining joint health and strength over time, he notes.

Redefining the mobility consumer

The vast majority of sales of mobility and joint health ingredients come from an over-40 demographic, says Steve Fink, vice president of marketing at PLT Health Solutions. "In fact, it's a goal of product formulators to try to attract younger consumers – and this often proves difficult. Things might be changing here, however."

PLT Health Solutions recently paired with Laila Nutra on a clinical study testing the former's Dynagenix joint health ingredient. The study focused on a younger cohort than typical joint health studies to address "achieving peak performance" as well as "fixing what's broken," says Fink.

Meanwhile, rising healthcare costs, particularly in countries where healthcare is privatized, has emphasized the importance of taking preventative measures ahead of old age, notes Pauline Huang, marketing manager from Rousselot Health and Nutrition.

Active people engaged in high-intensity exercise or sports tend to take joint health supplements for joint support and aid recovery, says Suhail Ishaq, president of BioCell Technology. "Joint discomfort prevalence increases in tandem with age. Therefore starting a supplement like BioCell Collagen in the mid-20s or 30s as a preventative measure cannot hurt."

Seniors at the core

Despite the growing younger consumers group, the key audience in the mobility scene still consists of older generations, according to Reguant of Bioiberica. UN data highlights that by 2050, the over-65 demographic is expected to represent 16 percent of the entire market, up from 9 percent in 2019. "It's therefore essential that companies continue to target these consumers even as the market and the products available diversify," Reguant maintains.

Divergent elderly

Nevertheless, seniors aren't just a one-size-fits-all category. Older consumers are "a very heterogeneous group" that can't be uniformly categorized, according to Rebecca Cuthbertson, global head of medical nutrition at Fonterra Medical.

"From our research, we see five core market segments, ranging from 'unwavering indulgers' who are least likely to change their behaviours, even for health reasons, right through to 'active seekers' who are purposefully seeking improvements in their health, utilizing nutrition, exercise and holistic measures," she says.

Fonterra Medical has further observed that senior consumers are "very much open" to trying new products. Still, their purchasing decisions are heavily influenced by the efficacy of nutritional solutions for maintaining mobility. "We know that older consumers, particularly for the mobility category, will cycle different products until they find a one that suits them best," Ishaq of BioCell Technology chimes in.

"Randomized controlled clinical trials continue to be the gold standard for proving the efficacy of nutraceuticals. Marketers that effectively leverage the science while telling a compelling story tend to do better in our experience," he details. Agreeing that older consumers are "far from being stuck in their ways," Vouche at Lonza adds that consumers of different demographics may turn to different channels for their trusted information.

"For older consumers, for example, it might be particularly important to hear potential solutions directly from a healthcare practitioner," he underscores.

Regional differences in respect for age

Effective product positioning for seniors depends hugely on the market, says Rebecca Cuthbertson, global head of medical nutrition at Fonterra Medical. Talking about "older consumers" or "aging" in general is less well-accepted in Australia or New Zealand, with more brand focus on anti-aging as a segment, she highlights.

To meet this need while still targeting older consumers, Cuthbertson points out that functional claims on strong bones, strong muscles or vitality may resonate more clearly – and most importantly, inoffensively. Meanwhile, aging is celebrated more in Asian cultures.

"In APAC, for example, people gain respect as they age, making them comfortable with the idea of growing older and consuming supplements marketed toward senior consumers," adds Huang from Rousselot. "We can see a stark contrast in Western countries, where individuals in their mid-50s and 60s do not identify themselves as part of the 'silver population' and are unlikely to buy products that are positioned as healthy aging solutions," she details.

Trending in mobility

The mobility market is predicted to innovate via three avenues – bioavailability, delivery formats and personalization. Functional foods are on the rise, as consumers seek to take a holistic approach to their physical health. This is also spurring demand for convenient delivery formats – with consumers preferring a "one product fits all" solution that can be taken easily and on-the-go. Lonza found in its research that convenient, once-a-day supplementation is a key priority for as many as 72 percent of German consumers.

"One of the key things formulators should look for is flexible, low-dose ingredients that work well in holistic products with other ingredients," says Reguant.

Bioavailability piggybacks off of the optimizing ingredient formulation trend. "Although a large proportion of people do not fully grasp the term 'bioavailability,' they do understand that it is important for a supplement to be well absorbed by the body," says Huang. "To build consumer trust and loyalty, it is becoming more important than ever to provide scientific evidence in consumer-friendly language for the bioavailability of the ingredients used to formulate products," she details.

Personalization on the rise

Meanwhile, the trend for personalized nutrition can be attributed to growing consumer demand for tailored solutions that address specific health concerns, says Huang. "Given the fact that supplement users are proactively looking to improve their health, it comes as no surprise that they seek the customization that will grant them more control over their well-being."

In the immediate term, however, Cuthbertson flags that recovery from respiratory disease and negating the impacts of a sedentary lifestyle will be key for all ages – but primarily the older generation who are the worst impacted by the novel coronavirus infection and lockdown.

"Considering ways to exercise while at home, alongside consuming quality protein at the right levels help to support mature muscles are both key trends where we expect to see innovation," she concludes.
By Anni Schleicher

New UK institute to spearhead healthier diets for the elderly

21 Oct 2020 Nutrition Insight

The University of East Anglia, UK, is teaming up with a number of research groups in the East of England to investigate healthier diets for elderly people.

Researchers will form an institute called the Norwich Institute for Healthy Aging (NIHA). They will include over 200 scientific researchers from the university who will work with existing institutions and local government to help implement dietary changes.

NIHA director Professor Anne Marie Minihane says that the institute's aim is primarily to realize findings that have long been established in research but never had significant social impact.

"We have a long background in research on nutrition and health, but despite many years of research, diets are actually still quite poor. Recent research in the British Medical Journal found that less than 0.1 percent of people follow basic dietary recommendations."

The institute says it will be taking a practical approach to these issues, rather than simply focusing on further scientific inquiry.

"We will see human health as a composite of many different factors like diet, smoking and exercise. Usually, researchers will isolate specific behavioural factors but the NIHA will bring them together," adds Minihane.

Aging populations are growing due to medical interventions, but often elderly people face poor health due to their lifestyle choices. This is represented in the rate of disease, Minihane explains.

"The average person in the UK spends around 15 to 20 years living with a clinical diagnosis of a disease, such as type II diabetes or heart disease," she remarks.

However, many people lead a low quality of life at old age without necessarily facing disease, she continues. "We think of health in a broader remit than disease diagnosis. We need to add life to years along with years to life."

New industry opportunities

The NIHA will be looking to converge research with local councils' health departments to target areas that have been highlighted for inequality and deprivation. "The idea is that we develop strategies and infrastructure to help communities adopt healthier eating behaviours and improve their overall nutrition," says Minihane.

NIHA's opening is expected to present new opportunities for industry to become involved in bettering living standards.

"Often, the interventions we implement are collaborations with industry professionals, which is something we do on an ongoing basis – we look at bioactives, for example, and we co-produce new products and innovations to further our cause," Minihane notes.

"We are definitely looking for more industry partnerships. We are major players in the UK and globally for healthy eating, and this is a major opportunity to bring needed change," she concludes.

"The expanding population of elderly people presents a challenge and opportunity alike for researchers, governments and industry innovators."

By Louis Gore-Langton

Supermarket trial reveals shoppers can be nudged toward healthy choices

19 Oct 2020 Nutrition Insight

A year-long collaboration between supermarkets and food manufacturers in the UK to improve public health has proven the powerful influence retailers can have on consumer diets.

Simple tactics to encourage healthier purchases saw fruit and vegetable sales increase by 13 percent, along with a 19 percent drop in french fries sales and a 22 percent drop in confectionery sales. These were some of the key findings of the 12-month trial led by Collaboration for Healthier Lives (CHL), Guy's and St Thomas, a London-based charity.

Results from the trials were analyzed at the University of Oxford. Fourteen supermarket chains collaborated with manufacturers on interventions that could alter consumer purchasing choices. A total of 34 intervention techniques based on behavioural science theories were trialled. These included pricing and promotion changes, product placements, nutritional labelling and social feedback techniques.

Significant impacts

Supermarkets participating in the trials showed remarkable differences in sales resulting from these tactics. By using promotions aimed at children, Sainsbury's increased sales of fruit by 387 percent. Following the end of the trials, this dropped to 17 percent. After introducing a healthy option on frozen french fries, manufacturer McCain's witness sales of its standard packs fall by 28 percent.

Tesco revealed a 24 percent drop in seasonal confectionery sales after removing display units for Easter chocolates. This accounted for 2,450 fewer units being sold each week across 35 stores. Other trials produced statistically insignificant results that the CHL says need to be investigated further.

Top tactics

CHL's Behavioral Insights Team marked out some of the most effective tactics utilized in the trials to change consumer buying choices with pricing and promotions, availability, positioning, labelling and social feedback.

Creating financial incentives to purchase healthier foods is often highly effective, as are advertising promotions. This is especially the case for children's products; influential messengers such as kids' characters and 'gamified' campaigns for collecting tokens can be strong attractions.

These kinds of promotions should be strictly limited to healthy food products only, the report recommends.

Manufacturers are encouraged to shift the bulk of their products onto healthy options, making them more available and accessible. Sainsbury's biscuits and McCain's oven chips have both had success in this.

Placing confectionary at supermarket checkouts should stop immediately and be replaced by healthy snacking options. Product placement in stores has a significant impact on consumer choices, as does the quantity of shelf space a product is given. Limiting the ease of access to unhealthy products showed great success in the trials.

Nutritional information on packaging is often only read by a minority of consumers. This can be addressed by making simpler, color-coded health warnings on product shelves. Traffic light labelling and prompts, such as 'stop' signs at confectionary aisles, also showed success in the trials.

Finally, giving customers feedback on their shopping choices lets them know how their diets may compare to others. This type of social pressure was also proven to be highly effective. Ultimately, the report recommends making healthy options the easy options.

Turning the tide on obesity

While these results are significant, they were limited in scope and, in some cases, lacked control groups by which to compare results. CHL says that more trials need to be implemented simultaneously and in a more significant number of places.

Businesses need to start seeing improvements in health as an imperative, the report says, and partnerships should support this with other companies and NGOs. The tactics used in the trials should be scaled up and further tested.

Many more such collaborations and trials are needed to turn the tide of obesity and other related health problems, CHL concluded.

By Louis Gore-Langton

Digital tools "complement, not compete with" conventional dietetic practices, study finds

30 Oct 2020 Nutrition Insight

Using technology in combination with advice from dietitians can improve dietary intake in adults, with more personalized diet plans leading to better results. These findings suggest that digital tools complement, rather than compete with, conventional consultations with dieticians.

These are the findings of a new study from the University of Newcastle in Australia. Researchers split 50 participants into a low personalization (LoP) group and a high personalization group (HiP). Participants were recruited via print and online marketing from the university, with 89 percent in the final study being female. The researchers measured the dietary intake of the two groups at baseline and 12 weeks after. "While we expected that the HiP group would be able to make significantly more improvement in their dietary patterns, it was still a surprise just how much they were able to improve their dietary patterns," Megan Rollo, lead author of the study, tells NutritionInsight.
Those who had access to digital tools and a dietitian reduced their intake of energy-dense, nutrient-poor foods more than those who used self-monitoring alone. "At baseline, HiP had about 35 percent of their total energy intake coming from energy-dense, nutrient-poor (EDNP) foods and this dropped by about one third," she adds. Notably, HiP's decrease in EDNP was 7 percent greater compared to those in the LoP group.

Personalized nutrition in the digital age

These findings may help personalized nutrition platforms gain a better understanding of what works best. Namely, the research investigates the best forms of telehealth – the digital distribution of health-related services.

"Telehealth has the potential to improve access to nutrition support services provided by dietitians and extend the reach to people living in rural and remote areas." "It will also mean a better ability to standardize costs while providing more information about a person's diet and their nutrient intake than we have been able to before," she adds.

Taking online assessments to the next level

Those in the LoP group complete a web-based, personalized nutrition feedback report generated using the Australian Eating Survey (AES). Results were generated instantly and participants were invited to take the survey again six weeks into the study.
The HiP group, in contrast, was given more support, which involved structured video calls with a dietitian using the AES report. In addition, participants in this group self-monitored their diets by taking pictures of their food, while being reminded by text messages to do so. The HiP group also completed a personalized nutrition questionnaire (PNQ). This is a tool designed to support the dietitian by identifying and prioritizing factors that the individual perceives as impacting their ability to eat healthy foods.

"Since creating this online dietary assessment tool, we wanted to test what the impact was both as a stand-alone tool and as part of telehealth services provided by dietitians. We also wanted to test the feasibility of the concept of the PNQ as a tool for dietitians," says Rollo. "We know that specific behavior change techniques enhance adherence to making healthy lifestyle changes and the components of the interventions for the HiP group were complementary to each other," she says. HiP participants also set goals with the dietitians, both in the short- and long-term.

Beyond self-monitoring

Rollo concludes that telehealth delivered by a dietitian could be effective at improving the dietary intake of adults, perhaps more so than self-monitoring alone. By collecting data prior to the consultation, the dietitian can spend more of the one-on-one time delivering personalized behaviour counselling and nutrition education strategies, notes the study. The implications of the increasing ubiquity of information and communication technologies in daily life could provide an opportunity for dietitians to focus on higher-level skills, taking the burden of data collection off their shoulders. Rollo notes that many more research studies are being carried using a similar approach and further research should be conducted with more diverse populations.

Telehealth bolstered by social distancing

NPD is tapping into the telehealth trends with launches such Proper's sleep-aid supplements and a personalized coaching app.
The subscription-based model taps into the growing telehealth market, which has "exploded during the COVID-19 pandemic," Proper notes.
By Missy Green

REGULATORY NEWS

Mandatory fortification in India: Regulation set to compel firms to fortify edible oil and milk - FSSAI exclusive

By Pearly Neo
22-Sep-2020 – NutraIngredients Asia

The Food Safety and Standards Authority India (FSSAI) has revealed plans to make fortification mandatory for edible oil and milk over the next few months, in addition to intensifying its focus on local staples such as rice, wheat and salt.

According to FSSAI Director (Food Fortification Resource Centre/FFRC) Inoshi Sharma, the mandatory regulations will apply to all food and beverage companies dealing in edible oil and milk within India's organised food sector.

"At present it is not mandatory to fortify these foods, but we will be issuing regulations in about three or four months that will make it compulsory for all edible oil and milk from any manufacturer in the open market to be fortified," Sharma told FoodNavigator-Asia . "This applies to all companies within the relevant organized sectors in India, so the big food firms and SMEs alike –but of course if the producer is not part of the organized sector and is just selling milk from the two cows in his backyard, then this will not apply.

The new FSSAI new regulations will allow for higher levels of fortification to be achieved by permitting fortificants to be added up till amounts that will translate to provide between 30% and 50% of the Recommended Dietary Allowance (RDA).

"Previously there were concerns that eating too much of fortified foods could lead to toxicity, hence it was limited, but we have found that this range will be safe for consumers as even eating the foods through the day won't make them cross their RDA levels," she said.

When queried if any resistance or challenges were expected towards these mandates, Sharma was very optimistic that the industry would be receptive. "Many big manufacturers are already producing fortified products, and it's mostly smaller players who are left, so we don't really anticipate too much of a challenge for implementation," she added.

"We have a wide network of partners in place as well as a lot of resource material out there to help all companies who want to make this change, so it should be relatively straightforward."

"What's important is we want to align the supply chain - So on the supply side, we've got producers, distributors and retailers fortifying products and pushing these in the market, and if such fortified foods are made easily available in the market, it will be easier to gain consumer acceptance of these as well; whereas on the demand side, we create consumer awareness [to drive demand]."

Sharma also told us that the fortification of rice, wheat and salt has been mandated in the food given out via India's public food distribution systems, such as to schools, lactating mothers or children under six years of age, although this has not made it to the open market as of yet.

"Since 2018, regulations have mandated this in the public systems – the government will procure the rice or wheat from farmers and producers, and fortify this during the milling and processing stage," Sharma said.

"As of now, these are not yet mandated in the open market, although quite a few products do already exist, and we are working with the big manufacturers to try and get them to do this – for example we've spoken to some big rice millers in August, and will be doing the same for wheat next month.

Some of the major brands that are already pushing out fortified products include Annapurna and Pillsbury for wheat flour, Daawat for rice, Britannia and Mother Dairy for milk, TATA for salt and Freedom for oil. All products that are fortified as per the standards laid out by FSSAI will be able to get a license and what is called the '+F' endorsement.

"The +F endorsement is essentially a logo and brand to help consumers recognized certified fortified foods, and hopefully choose to include these in their diets," Sharma explained.

"We also support products under the +F endorsement by putting these on our website, and local states going through the fortification process do look at our website and refer to these. So if any manufacturer has a fortified product, please do contact us about this so we can put it up there too."

The major nutrient deficiencies being targeted via fortified edible oil and milk are Vitamins A and D, whereas fortified wheat flour and rice looks to tackle iron, folic acid and vitamin B12 deficiencies, and fortified salt targets iodine. A new type of double-fortified salt targets both iron and iodine simultaneously.

"Previous studies have found a significant population, especially of women and children below five years old, to be anaemic, so there's iron deficiency there, and we also saw vitamin deficiencies steadily increasing," said Sharma.

"Many foods in the West are fortified, so they suffer less of these issues, but in India we have an issue of consumer choice in addition to the accessibility and availability of such foods. This is why we looked to staples such as rice, wheat and so on, as fortifying these makes it much easier to get these nutrients to the population."

New plastic-eating 'super enzyme' offers hope for full recycling

By Oliver Morrison
01-Oct-2020 – Food Navigator USA

A new 'super enzyme' that eats plastic up to six times faster than before may offer food and beverage companies a potential solution to the problem of plastic waste.

Scientists said the super-enzyme is derived from bacteria that naturally evolved the ability to digest plastic. It enables the full recycling of plastic bottles and waste and could soon be used for recycling.

The research was co-led by Professor John McGeehan, Director of the Centre for Enzyme Innovation (CEI) at the University of Portsmouth, and Dr Gregg Beckham, Senior Research Fellow at the National Renewable Energy Laboratory (NREL) in the US and is published in Proceedings of the National Academy of Sciences (PNAS).

The same team first engineered an enzyme called PETase – found in a plastic eating bug in a Japanese rubbish tip in 2016 - that could digest commonly polluting plastics in 2018. This started breaking down the plastic in a few days.

A second enzyme, found in the same rubbish dwelling bacterium that lives on a diet of plastic bottles, was combined with PETase to speed up the breakdown of plastic.

PETase breaks down polyethylene terephthalate (PET) back into its building blocks, creating an opportunity to recycle plastic infinitely and reduce plastic pollution and the greenhouse gases driving climate change, said the scientists.

PET is the most common thermoplastic, used to make single-use drinks bottles, and it takes hundreds of years to break down in the environment. The original PETase enzyme discovery heralded the first hope that a solution to the global plastic pollution problem might be within grasp, though PETase alone is not yet fast enough to make the process commercially viable to handle the tons of discarded PET bottles littering the planet.

Combining it with a second enzyme, and finding together they work even faster, means another leap forward has been taken towards finding a solution to plastic waste, said the scientists. PETase and the new combined MHETase-PETase both work by digesting PET plastic, returning it to its original building blocks.

Over-regulation? Australian trade body slams new sports nutrition rule as a costly hurdle

y Tingmin Koe
30-Sep-2020 – NutraIngredients Asia

Australia's supplements industry body has described the Therapeutic Goods Administration's (TGA) decision to class certain sports nutrition products as listed products as an over-regulation, adding that this will result in higher production costs which will hit consumers.

The TGA announced that sports supplements will be regulated as therapeutic goods so long as they make therapeutic claims and/or contain higher-risk ingredients and/or come in tablets, capsules, pills form. Examples of therapeutic claims include gaining muscle, increasing mental focus, increasing metabolism, increasing testosterone levels, preparing for workout, and recovering from workout.

Companies will have about two months to prepare themselves to TGA's standards if their products contain substances scheduled in the 1) Poisons Standard or 2) the World Anti-Doping Code International Standard Prohibited List or a substance relevant to dendrobium or methylliberine.

From November 30 this year, such products will need to be entered in the Australian Register of Therapeutic Goods (ARTG) and regulated as therapeutic goods before they could be advertised and sold in the market. Others which do not contain the higher risk ingredients but come in tablets, capsules, or pills and make therapeutic claims are given three years to comply with the requirements (until 30 Nov 2023). The decision was made following 18 months of consultation with the industry stakeholders.

"We believe the TGA is basically taking a sledgehammer to crack a nut. The TGA is exercising its muscle and providing a very high level of regulations going forward to supplements," said Complementary Medicines Australia (CMA) CEO Carl Gibson. "I will prefer to see the TGA focus on the illegal imports of the sports supplements ingredients, rather than try to over-regulate a very compliant sports supplement sector," he said.
He added that the CMA would conduct discussions with the TGA to ensure that the transition happens smoothly and also to appeal to the health minister to focus on address illegal importation.

Prior to the decision, sports supplements are regulated as foods via the Formulated Supplementary Sports Foods framework and can make therapeutic claims, as well as being made in formats that are associated with medicines rather than foods.

Under the new ruling from TGA, products which do not fall into any of the above categories will continue to be regulated as foods. Examples include meal replacement shakes, muesli bars, and protein powders. Producing the sports supplements to TGA standards means that consumers will need to bear a higher cost, said Gibson. For instance, companies will need to pay about AUD$1k (USD$702) to list a product in the ARTG. In addition, companies will need to prepare evidence pack to back up each of the therapeutic claims on their products, and the evidence pack will cost about another AUD$45k (US$31k) to AUD$50k (US$35k).

Affected companies which have decided to comply with TGA standards will also need to ensure that the products are made in TGA-audited and GMP-certified facilities, which will add onto the cost. This also means that Australia-made products will become less price competitive in the export market, said Gibson. He added that there was also the concern of whether the industry has the capability to produce the number of sports supplements present in the market in the future. "We also flagged the issue on the capability of the amount of TGA listed facility that can produce the quantities of sports supplements today. We are trying to assess if there is the capability and the facilities available to produce that level of sports supplements moving forward."

Another option for the affected companies is to modify their product so that it can be regulated as foods, however, it might not be in their interest to do so. For instance, they could modify their product by changing the product claims to not refer to performance in sport, exercise or other recreational activity. "That will damage them when it comes to promotion and marketing of their product in the stores, because they wouldn't be able to make claims on those products going forward," said Gibson.
They can also change the product formulation to remove ingredients in scope, or change the product dosage form from tablet, capsules, or pills to more traditional food presentations.

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Contact:
meeta.raheja@jrsindia.com
rasika.nachane@jrsindia.com
Telephone- 022- 4024 3817-21
www.jrs.de